# AVIATION WEEK

A McGRAW-HILL PUBLICATION

NOVEMBER 12, 1951

50 CENTS



# Now Goodyear tires are landing at 250 mph

HAVING successfully completed test requirements for landing and take-off in the 240 mph speed age, Goodyear high-pressure airplane tires for jet craft are currently under test at 250 mph on the w dynamometer at Wright Air Development nter of the U.S. Air Force.

multaneous automatic control and recording rate of change in speed and load on this new strument permit for the first time the simu- tion of landings of highest-speed jet aircraft.

or further information on these tires and other odyear Aviation Products—tubes, wheels, brakes, craft hose, the Cross-Wind Landing Wheel, ectro-thermal Iceguards and Airfoam Super- ushioning—write Goodyear, Aviation Products ivision, Akron 16, Ohio or Los Angeles 54, Calif.

GOODYEAR AVIATION PRODUCTS

The new 250 mph dynamometer at Wright Field is shown here with Goodyear Rib All-Weather Tread Tire on test for use on high-speed jet aircraft.

Iceguard, Airfoam, All-Weather —T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

# The Northrop F-89 *Twin* Jet Interceptor is equipped with ZENALOY* parts — by *Zenith*

The U. S. Air Force's Northrop Scorpion all-weather, night-and-day interceptor, with its sextet of 20 mm. cannon in the nose section and 16 five-in. high velocity rockets under its wings can give a terrific account of itself in actual combat.

ZENITH's contribution of the nose assembly to this formidable "Scorpion that carries its sting in its nose," is another example of the effective combination of engineering plus production efficiency.

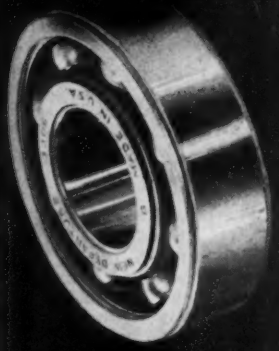
**OTHER AIRCRAFT EQUIPPED BY ZENITH:** Aeronca • Bell • Boeing • Cessna • Chance-Vought Consolidated-Vultee • Curtiss-Wright • Douglas • Fairchild • Lockheed Martin • McDonnell • North American • Republic

**R.P.*** REINFORCED FIBERGLAS PLASTICS

**ZENITH PLASTICS CO. • Gardena, California**

# Creative Engineering at your service

More than forty years of research
and its practical application
have provided New Departure engineers
with a vast fund
of technical know-how
and the resourcefulness of experience.
Consultation on *successful* ball bearing application
is available upon request



*Nothing Rolls Like a Ball...*

## NEW DEPARTURE
## BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

1-54

# TRIPLE PLAY
## by Adams-Rite

**NEED AN ASSEMBLY DESIGNED, MANUFACTURED and DELIVERED WITHOUT HEADACHES?**

This is the kind of 3-point responsibility in manufacturing Adams-Rite would like to do for you!

**1.**

**TAKE THIS FLUSH LOCK ASSEMBLY**

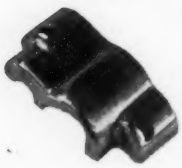
Adams-Rite built it to fit a specific need for the main entrance hatch on the world's largest bomber.

**2.**

**THEN TAKE THIS WIRING CLIP—**

Another customer had a smart idea and we helped perfect it. The design was completed and production started within 45 days.

**3. AND WE CAN PLATE ON MAGNESIUM, TOO!**



Adams-Rite is the only plant west of the Mississippi that is equipped to plate on magnesium. This is just another manufacturing advantage that we can offer.

***May we quote on your subcontracting work?***

**ADAMS-RITE MANUFACTURING CO.**
540 WEST CHEVY CHASE DRIVE, GLENDALE 4, CALIFORNIA, U. S. A.

REPRESENTATIVES
Robert North
338 Simmons Ave. Webster Grove, Mo.
George E. Harris
Municipal Airport, Wichita, Kansas



# Aviation Week

ABP Member ABC

**Volume 55** **November 12, 1951** **Number 20**



### Headline News

Copter Firms' Commercial Plans.....13
Northrop Doubles 1950 Gross.....15
How Effective Small Business Aid?....15
Civil Non-Carrier Aircraft Quotas.....16
How Many Civil Non-Carrier Craft?..17
How GE Shares Jet Engine Dollars...17
Extra Power-on Aid to Hovering Copter.17
Planes on Loan.....18
Steel Slash Kills Building Plans.....18

### Aeronautical Engineering

Seek Answers to Mach 3.5 Speeds.....20
Britain's Triple-Threat Jet.....33

### Production

AIA Looks to Future Use of Titanium.34

### Equipment

Ingenuity Beats Local's Problems.....48
New Jet Tester Speeds Overhaul.....50

### Air Transport

Mexico Meeting Earns Goodwill.....59
World Flies on American Wings.....60
CAB Changes Mind on Stall Warners..60
CAB Sets Causes in National Crash....61
Italy's Phantom Airlift.....62
Instrument Approach Time Improved..62
Air France Places U. S. Avionics Order.63
Air Coach Idea Grows in Australia....63

### Editorial

What's Going On? Plenty!.....74

### Departments

News Digest ..... 7
Aviation Calendar ..... 8
Picture Page ..... 9
Who's Where .....11
Industry Observer .....11
Washington Roundup .....12
NACA Reports .....28
USAF Contracts .....44
Letters .....47
New Aviation Products.....55
Also on the Market.....56
Shortlines .....64
Cockpit Viewpoint .....72
What's New .....72


**37,747 copies of this issue printed**


Robert H. Wood
EDITOR

Merlin H. Mickel.....MANAGING EDITOR

William Kroger.....Assistant Managing Editor
Alexander McSurely.....Assistant Managing Editor
Irving Stone.....Technical Editor
Ben Lee.....Military Editor
G. L. Christian III...Equipment & Maintenance
David A. Anderton.....Engineering
E. Lee Moore.....Transport
Katherine Johnsen.....Congress
Henry Lefer.....News Desk
A. W. Bentz.....News Desk
Scott H. Reiniger.....Editorial Assistant
Victoria Giaculli.....Editorial Assistant
Erwin J. Bulban.....Special Assignments
Leo T. Tarpey.....Editorial Makeup

*Editorial Offices:* 330 West 42nd St., New York 18, N. Y., Phone Longacre 4-3000, or (night) 4-3035; National Press Bldg., Washington 4, D. C., Phone National 3414.

*Domestic News Bureaus:* Atlanta 3, Rhodes-Haverty Bldg.; Chicago 11, 520 N. Michigan Ave.; Cleveland 15, Hanna Bldg.; Detroit 26, Penobscot Bldg.; Los Angeles 17, 1111 Wilshire Blvd.; San Francisco 4, 68 Post St.; Houston, 514 South St. *Correspondents* in more than 60 major cities.

*Foreign News Bureaus:* London, Paris, Frankfort, Tokyo, Bombay, Melbourne, Rio de Janeiro, Mexico City. *Correspondents* in more than 50 major cities.

Robert F. Boger
PUBLISHER

R. W. Martin, Jr., *Sales Manager;* J. G. Johnson, *Business Manager;* Anita Scaffo, *Research and Marketing;* Sales Representatives: J. C. Anthony, New York; M. J. Storz, Philadelphia; H. J. Johnson, Cleveland; L. J. Biel, Chicago; W. E. Donnell, St. Louis; James Cash, Dallas; R. C. Maultsby, Atlanta; R. F. Dorland, Jr., San Francisco; C. F. McReynolds, Los Angeles. Other sales offices in Pittsburgh, Detroit, Boston, London.



November 12, 1951 AVIATION WEEK Vol. 55—No. 20
Member ABC and ABP

Published weekly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. **Publication Office: 99-129 North Broadway, Albany 1, N. Y.**
**Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 18, N. Y.** Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Division; Ralph B. Smith, Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.
**Subscriptions: Address correspondence to AVIATION WEEK—Subscription Service, 99-129 N. Broadway, Albany 1, N. Y., or 330 W. 42nd St., New York 18, N. Y. Allow ten days for change of address.**
**Please indicate position and company connection on all subscription orders.**
Single copies 50¢. Subscription rates—United States and possessions, $6 a year; $9 for two years; $12 for three years. Canada, $8 a year; $12 for two years, $16 for three years, payable in Canadian currency at par. Pan American countries, $10 a year; $16 for two years; $20 for three years. All other countries, $20 a year; $30 for two years; $40 for three years. Entered as second-class matter, July 16, 1947, at the Post Office at Albany, N. Y., under Act of Mar. 3, 1879. Printed in U. S. A.


Copyright 1951 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved. Cable address "McGraw-Hill New York." Publications combined with AVIATION WEEK are AVIATION, AVIATION NEWS, AIR TRANSPORT, AERONAUTICAL ENGINEERING and AIRCRAFT JOURNAL. All rights to these names are reserved by McGraw-Hill Publishing Co.

# Crazy with the heat!

***Radar and electrical equipment on supersonic airplanes goes haywire unless cooled to "livable"* temperatures!***

"Make it smaller!" was the plea of aircraft builders to the radar and electrical manufacturers.

So they did. Electronic tubes came down to "peanut" size, and the little black boxes housing equipment to operate guns, bomb sights, cameras, navigation and communication devices became smaller and smaller.

But as size decreased, *temperature increased!* It was found that, at high speeds and altitudes, radar and electrical equipment went haywire. The only answer was to cool this equipment, in the same manner cockpits are cooled for pilots.

AiResearch — world's most experienced concern in aircraft pressurization and air conditioning — went to work. Today ways are being pioneered here to cool the little black boxes. Much remains to be accomplished: Work that calls for close cooperation between AiResearch and the makers of airframes, engines, radar and electronic equipment.

AiResearch has the skilled engineers, laboratory, testing and manufacturing facilities, and the "know how" gained through 12 years of solving problems in the refrigeration and pressurizing of aircraft. That's why nearly every post-war airplane is AiResearch equipped!

* To the temperature limits of AN-E-19

AiResearch
DIVISION OF
THE GARRETT CORPORATION

• ***AiResearch — specialists in the design and manufacture of aircraft refrigeration equipment — is a leader in the following major categories:***

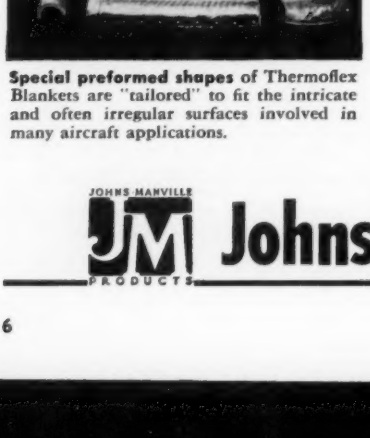
Air Turbine Refrigeration • Cabin Superchargers • Gas Turbines • Pneumatic Power Units • Electronic Controls • Temperature Controls • Heat Transfer Equipment • Electric Actuators • Cabin Pressure Controls

**AiResearch Manufacturing Company, Dept. E-12, Los Angeles 45, California**

## On the new delta wing CONVAIR XF-92A

*Convair's XF-92A* . . . the new delta wing experimental interceptor pictured above has flight-proved its greater maneuverability, better stability, and low drag at ultra-high speeds.

**Thermoflex Blanket being applied** to a jet engine exhaust cone. Special grooving assures precision-fit around cylindrical and conical surfaces . . . and allows for expansion at high temperatures.



**Special preformed shapes** of Thermoflex Blankets are "tailored" to fit the intricate and often irregular surfaces involved in many aircraft applications.

# J-M THERMOFLEX BLANKETS

## insulate against the searing heat generated by jet power

ONCE AGAIN, Thermoflex* Blankets have been chosen to insulate a new design aircraft against the searing heat generated by jet power. In this case, both the engine cone and afterburner of the XF-92A's turbojet engine are insulated with Thermoflex Blankets.

Now standard protection for many Air Force and Navy jets, these flexible blankets meet the most critical thermal and physical requirements for jet aircraft design. The blanket is fabricated with low-density Thermoflex RF Felt sealed between sheets of corrosion-resistant metal foils which are edge-folded and seam- or spot-welded.

On one face of Thermoflex Blankets, the foil is specially grooved to insure precision fit around cylindrical and conical surfaces . . . and to allow for expansion due to intense heat without damage to the felt filler. To further assure proper fit, careful attention is given to the precise location of cutouts for mounting thermocouple leads, fuel, air, igniter and hydraulic lines . . . as well as actuator brackets, etc.

In addition to Thermoflex Blankets for insulating turbine casings, exhaust cones, afterburners and tail pipes of turbojet, turboprop and auxiliary power units . . . special preformed shapes are available to insulate, protect, and fireproof heating systems, de-icing ducts, fluid storage tanks, and many other assemblies.

For further information about Thermoflex Blankets, send for your copy of booklet AV-1A: "Johns-Manville Aviation Products." Address Johns-Manville, Box 290, New York 16, N. Y. In Canada: 199 Bay Street, Toronto, Ontario.

*Reg. U. S. Pat. Off.

JOHNS MANVILLE JM PRODUCTS **Johns-Manville** PRODUCTS for the AVIATION INDUSTRY

# NEWS DIGEST

## DOMESTIC

**Air Line Pilots Assn.'s** executive board has recommended that its attorneys amend suit against deposed-President David L. Behncke to include damages allegedly suffered because of his actions against ALPA. The board also set up machinery to get a referendum ballot from members reaffirming the recall of Behncke and the election of Clarence Sayen as new president.

**Pacific Southwest Airlines'** DC-3 crash-landed shortly after takeoff from Lockheed Air Terminal, Burbank, on Oct. 31. The 28 aboard reportedly were only shaken up. Mishap was attributed to engine failure.

**Edwin White,** 69, Northwest Airlines director and investment banker, was fatally injured in an automobile accident Oct. 22 near Prescott, Wis. White became a member of NWA's board in 1939.

**Lt. Cmdr. William Fay** will soon be transferred from the Navy's Office of Information, Washington, D. C., to new duty in Pacific Fleet Headquarters, Pearl Harbor. His post will be filled by Lt. Ed Prina, former Washington Star reporter.

**World speed record** for 100 kilometers, (635.686 mph.) set by Col. Fred J. Ascani in a North American F-86E Sabre just prior to the Detroit 1951 National Air Races, has received Federation Aeronautique Internationale approval.

**Transocean Air Lines'** Martin 2-0-2 crashed Nov. 5 while attempting an unscheduled landing at Tucumcari Airport, N. M. Chartered by the Army to carry Korean veterans from Oakland, Calif., to Indiantown Gap, Pa., and Ft. Devens, Mass., the 2-0-2 reportedly was forced into Tucumcari because of bad weather, hit just off a runway. Of the 32 passengers and crew of three, one died and nine were reported injured.

**Leslie E. E. Neville,** veteran aviation editor, author and until recently with Curtiss-Wright's public relations executive staff, has been named director of the new Armed Services Technical Information Agency with temporary offices in the Pentagon. Neville was chief editor of Aviation Magazine prior to 1947.

**CAA has ordered** 75 Magnachord 4-channel tape recorders, 25 playback and 25 eraser units for installation in the 25 airport towers in the U. S. handling the heaviest traffic. Deliveries start in January.

**Ten Convair-Liner 340s** have been ordered by Chicago & Southern Air Lines, bringing Convair's firm orders for the 44-passenger transport to 113, plus approximately 100 military T-29 navigation trainers.

**USAF Public Information Offices** in the field are being "greatly" reduced because of budget cuts, AF spokesman says. Congress voted about $10 million for P.R. work by Defense Dept. and individual services.

## FINANCIAL

**Beech Aircraft Corp.** has voted a quarterly dividend of 20 cents a share on its 599,865 shares of common stock, payable Nov. 21 to holders of record Nov. 13. Beech total sales for the fiscal year just ended were over $32 million and backlog is well over $180 million.

**Cessna Aircraft Co.** has voted a 40-cents-per-share dividend on its 700,000 shares of common to be paid Dec. 14 to holders of record on Dec. 4, marking a doubling of the company's dividend for this year. This is the eleventh consecutive year company has paid a cash dividend. Cessna sales for fiscal 1951 were $26.5 million; its backlog is over $80 million.

**Chicago & Southern Air Lines** had net profits of $874,016 after taxes for the first nine months of 1951, a 121% gain over the corresponding period last year.

**Frontier Airlines** reports passenger revenues for September of $134,626, a 40% increase over September, 1950.

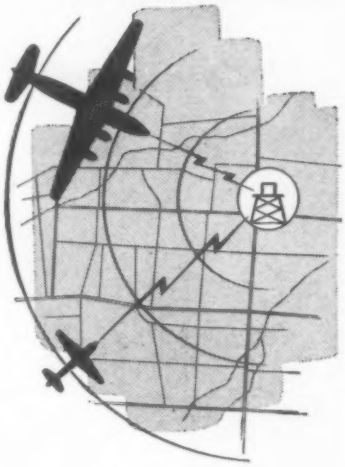
**Mid-Continent Airlines** has declared a 25-cent dividend payable Dec. 21 to holders of record on Dec. 10.

**United Air Lines** reports a third-quarter net profit of $3,754,702, compared with $4,234,296 for the same period last year. Nine-month net profit was $6,745,512, compared with $4,174,926 a year ago.

## INTERNATIONAL

**G. W. G. McConachie** has been elected president of the Air Industries and Transport Assn. of Canada. Chosen as vice presidents were C. H. Dickins and T. P. Fox. New secretary is M. E. Ashton; treasurer is A. Bandi.


# OMNI is for EVERYBODY!



## ...and ARC's VHF EQUIPMENT brings it to YOU!

Whether you fly private, executive, or transport aircraft, you can enjoy the safety of OMNI with ARC's compact type 15C VHF Navigation Equipment. OMNI takes the work out of navigation – gives you a reliable signal to follow, whatever your bearing to or from the station. Just tune in OMNI and keep the needle of your ARC indicator on zero. No worry about drift – no static interference.

**You get dependable navigation when you need it most!** In addition to OMNI navigation the 15C provides for use of the visual-aural ranges and runway localizers. And with an ARC type 17 VHF 2-way Communications System added, you get independent, static-free voice communication. ARC's VHF equipment gives you dependable navigation and communication you can't afford to be without. Write for all the details.

**All ARC Airborne equipment is Type Certificated by CAA. It is designed for reliability and performance, not to meet a price. Installations for both single and multi-engine planes are made only by authorized service agencies.**

ARC

AIRCRAFT RADIO CORPORATION
Boonton New Jersey
*Dependable Electronic Equipment Since 1928*

ENGINEERS DEPEND UPON

**FILTRON**

for RF INTERFERENCE SUPPRESSION FILTERS

CONSOLIDATED VULTEE B-36 BOMBER

**FILTRON IS SPECIFIED ON THE MAJORITY OF MODERN AIRCRAFT, GUIDED MISSILES, SIGNAL CORPS, ORDNANCE AND NAVAL EQUIPMENT**

**FILTRON'S** experienced RF Interference Suppression engineers are available for the measuring, testing, and filter design for your equipment. The modern shielded laboratories are equipped to measure RF Interference from 14 KC to 1000 MC, in accordance with military specifications.

**FILTRON'S** engineers have more than 700 standard filters available, or will design a unit to meet your size, weight, mounting, voltage and current requirements.

**FILTRON'S** capacitor manufacturing and coil winding divisions, metal fabrication shop and metal stamping departments are exclusively producing the highest quality components for **FILTRON'S** RF Interference filters.

RF INTERFERENCE SUPPRESSION FILTERS FOR:

| | |
|---|---|
| Motors | Dynamotors |
| Generators | Power Plants |
| Inverters | Actuators |
| Electronic Controls | Gasoline Engines |

And other RF Interference producing equipment

*Send for our LATEST CATALOG on your company letterhead*

THE **FILTRON** CO., INC.
FLUSHING, LONG ISLAND, N. Y.

LARGEST EXCLUSIVE MANUFACTURERS OF RF INTERFERENCE FILTERS

## AVIATION CALENDAR

Nov. 15-16—Seventh annual meeting of The Magnesium Assn., Biltmore Hotel, New York.

Nov. 16—Annual business meeting of the American Rocket Society, 29 W. 39 St., N. Y. 18, N. Y.

Nov. 22-24—Snowbird Soaring Meet, sponsored by the Elmira Area Soaring Corporation, Elmira, N. Y.

Nov. 27-30—Aviation Distributors and Manufacturers Assn. meeting, Waldorf-Astoria Hotel, New York.

Nov. 28-30—National convention of the American Rocket Society, Atlantic City, N. J.

Nov. 30-Dec. 5—Meeting of the American Society of Mechanical Engineers, Chalfonte Haddon Hall, Atlantic City, N. J. For information write: Ernest Hartfort, 49 W. 39 St., N. Y. 18, N. Y.

Dec. 4-5—Transport aircraft hydraulic accessory and system conference, sponsored by Vickers Incorporated, Hotel Sheraton, Detroit.

Dec. 6-7—Feedback Controls System, Chalfonte Haddon Hall, Atlantic City, N. J.

Dec. 17—Wright Brothers Lecture, sponsored by the Institute of Aeronautical Science, U. S. Chamber of Commerce Auditorium, Washington, D. C.

Jan. 5-6, 1952—Annual Miami Air Show, sponsored by the Florida Air Pilots Assn., Opa Locha Airport, Florida.

Jan. 28-Feb. 1—20th Annual Meeting, Institute of Aeronautical Sciences, Astor Hotel, New York.

Jan. 29-31—114th National Meeting of the American Meteorological Society, Roosevelt Hotel, New York.

March 3-6—Institute of Radio Engineers, Waldorf-Astoria Hotel & Grand Central Palace, New York.

March 17-19—Second Midwestern Conference on Fluid Mechanics, to be held at Ohio State University.

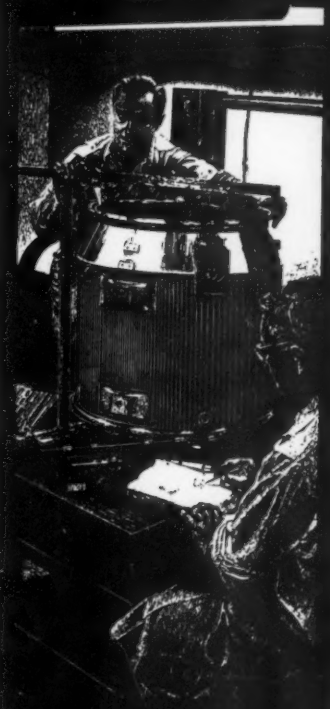
March 17-22—American Society of Tool Engineers, International Amphitheater, Chicago, Ill.

## PICTURE CREDITS

9—(Sabre Duo) Keystone; (Princess) INP; (Exterior) PAA; 13—Acme; 14—(middle) Hughes Aircraft; 20-21—NACA; 33—McGraw-Hill World News; 50, 52—Janke & Co.; 59—McGraw-Hill World News.

Lavelle

AIRCRAFT CORPORATION



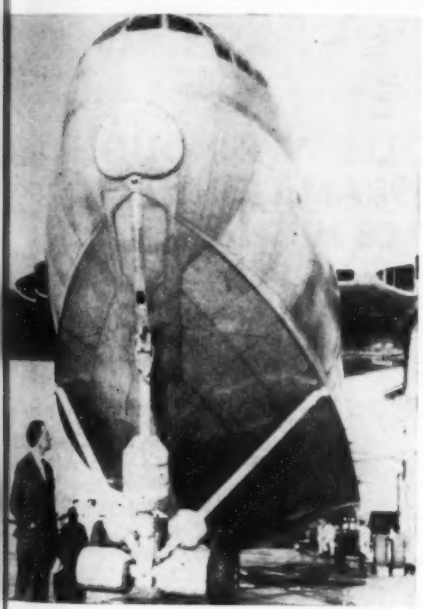
Years of experience in fabricating aluminum and steel *plus* modern production techniques make Lavelle truly a unique sub-contractor.

Savings and product improvement can often be made by Lavelle's Special Engineering Staff in their continuing search for better ways to do a better job.

Lavelle

AIRCRAFT CORPORATION
NEWTOWN, BUCKS COUNTY, PA.

SABRE DUO—No, this is not a two-seat F-86 Sabre trainer, but two F-86Es of the 33rd Fighter-Interceptor Wing creating that illusion by flying a really tight formation. Though not a stunt, such work requires a high degree of pilot skill.

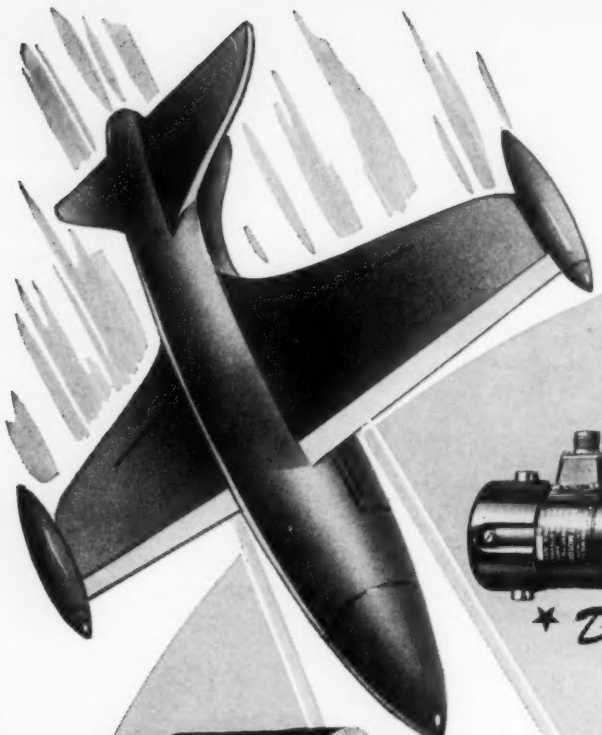


NOMAD AHEAD BY A NOSE—Avro Lincoln (above) has 3,000-shp. Napier Nomad composite diesel-turboprop engine in nose for flight testing. Diesel section turns one prop, axial and centrifugal compressor-fitted portion drives other prop. New powerplant promises low fuel consumption (Aviation Week Oct. 8, p. 14).

PRINCESS COMES OUT—Huge 140-ton Saro Princess flying boat (left) is scanned by test pilot Geoffrey Tyson after being moved out of hangar. Plane will have ten Bristol Proteus turboprops, is expected to make first flight next May.

# Plane News In Pictures

EXTERIOR DECORATING—PanAm Boeing Stratocruiser (right) shows off its new white-top paint scheme, which aids in keeping cabin interior 10-15 deg. cooler. Also shown are bigger, bolder identification markings, requested by USAF Interceptor Command to speed identification.



# Oster

REG. U.S. PAT. OFF.

★ Economy

★ Quality

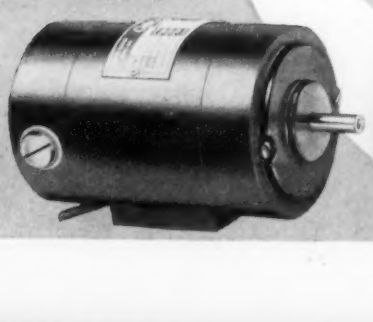
★ Dependability

★ Precision

★ Performance

★ Torque Inertia

★ Power Weight



## A FOLLOW THROUGH PROGRAM GEARED TO KEEP PACE WITH

# YOUR PROGRESS

You are constantly searching for improved methods of electro-mechanical power conversion to suit the changing demands of the aviation industry. We offer an engineering and production skill you can use! A staff of trained field engineers is at your disposal to work with you . . . to follow up and follow through on your problems. Electric motors have been our specialized business for more than 25 years. Call on us to help you select the motor best suited to your job.

**JOHN OSTER**
MANUFACTURING COMPANY
AVIATION DIVISION
RACINE, WISCONSIN

# WHO'S WHERE

## In the Front Office

**J. Nelson Kelly** has been promoted to executive vice president of Boots Aircraft Nut Corp., Stamford, Conn. With Boots since 1946, Kelly is a veteran flyer of both World Wars and at one time was an air mail pilot with Florida Airways.

**Francis S. (Doc) Doyle** has been named executive assistant to the president of Gyrodyne Company of America, Inc., St. James, L. I., N. Y. He is former production design head with Curtiss-Wright in Columbus and Buffalo.

**Steve A. Girard**, former assistant general manager, has been appointed vice president-operations of Kaiser-Frazer Corp. He has been with K-F since 1946.

**B. H. Atwater** has been promoted to vice president-sales and contracts of Pacific Airmotive Corp., Burbank, Calif. Atwater formerly was PAC's vice president-Eastern division. He joined company in 1946.

**Bernard W. Ford**, a director and vice president of Blyth & Co., Inc., has been named a member of the board of directors of Hiller Helicopters, Palo Alto, Calif.

**Joseph A. Geisler**, former plant superintendent at North American Aviation's Long Beach facility, has been appointed vice president-manufacturing for American Helicopter Co., Inc. Manhattan Beach, Calif., plant.

**Ernest Kruttschnitt** has been appointed administrative assistant for The Flying Tiger Line, Burbank, Calif., succeeding **W. R. Lynn**, who resigned to join Overseas National Airlines, Honolulu. Kruttschnitt has been in charge of the company's customer service department.

## Changes and Promotions

**Charles D. McCall** has succeeded **Frank J. Miller** as general sales manager of General Motors' New Departure division, Bristol, Conn. Miller resigned because of ill health. McCall is former manager of the division's regional sales office, Detroit.

**Kenneth E. Allen** has joined The Garrett Corp. as publicity manager for the company's AiResearch divisions. He is former public relations director for Western Airlines and previously held a similar position with Continental Air Lines. **Arthur J. Phelan** has been named manager of engineering at Garrett's AiResearch Manufacturing Company of Arizona at Phoenix. He formerly held engineering positions with Chrysler Corp. and Northrop Aircraft Inc.

**John Hodgson** is new flight manager-personnel for United Air Lines, with headquarters at Denver. He joined UAL as copilot in 1931 and has been serving as assistant flight manager at Seattle.

## Honors

**Juan T. Trippe**, president of Pan American World Airways, has been awarded the American Legion's certificate of meritorious service for co-operating with the Legion's "Tide of Toys" activities in 1951.

# INDUSTRY OBSERVER

► **Test estimated rollout date for the eight-jet Boeing XB-52 bomber at Seattle is about Nov. 20. Plane will undergo extensive ground and taxi tests before its first test flight early next year. Whether the plane will be demonstrated officially to the public and press on rollout is not yet decided. It is being deferred because of a reported desire of Air Force Secretary T. K. Finletter, to keep the huge craft under security veil. However, a heavily traveled highway separates Boeing plant from its airfield and the noise level from the eight Pratt & Whitney J-57 jet engines of 9,500-lb. thrust each, attracts plenty of attention from passing motorists.**

► Tipoff to the speed range of the Martin B-61 Matador pilotless bomber is in photographs released showing the B-61 in straight and level flight being chased by a T-33 and a Republic F-84 fighter. The fairly obvious conclusion to be drawn is that the USAF would not assign chase planes which were hopelessly outsped by the missile. F-84 top speed is known to be at least 620 mph.

► **The new General Electric J-73 turbojet engine will be the redesignated J-47-GE-21, and not the J-35-GE-21 as previously reported.**

► Cessna Aircraft Co. is keeping tight wraps on two new plane models 180 and 310, for which it has requested materials allocated late in 1952 and in 1953. Both still are in very early development stage, and the Wichita company is withholding details until much nearer the time of actual production. Only key to the planes beyond the model numbers is the fact that both are to be powered by Continental E-225-C engines with Hartzell HC12X propellers.

► **NACA is developing a helicopter rotor speed recorder at Langley Laboratory, Va., which is expected to be a valuable adjunct in extending service life of rotor mechanisms. It will be used later in tests in which Los Angeles Airways will cooperate with CAA, CAB and NACA.**

► Navy contract with Kaman Aircraft Corp., for installation of the junior-sized Boeing gas turbine of approximately 200 hp. in a helicopter, is being carried out on one of the K-225 ships which Kaman first built for the Navy, for test at Patuxent. Copter has been returned to Kaman for the new powerplant installation.

► **Bell Aircraft's big new Navy antisubmarine helicopter, designated XHSL-1, is nearing completion at Buffalo and will be shipped to the new Bell helicopter plant at Ft. Worth for its first flight there shortly after the first of the year. The three-ton craft, powered by a Pratt & Whitney R-2800 engine with 2,400-hp. for takeoff, incorporates overlapping tandem rotors of the Bell rigid two-blade variety with automatic stabilizer bars, and has quadricycle landing gear. It recently was disclosed that a commercial equivalent of the antisub craft could carry 20 passengers and cruise at 120 mph.**

► Rolls-Royce Ltd. of England is negotiating to manufacture its Nene jet engine in Canada to power the Lockheed T-33 trainers which Canadair Ltd. has started to build at Montreal for the Royal Canadian Air Force under license. Rolls has optioned a plant site near Montreal and has hired architect and industrial engineers in preparation for construction of a $250-million jet engine plant, Montreal reports say. Only Canadian facility now operated by Rolls-Royce is a branch engine overhaul plant at Dorval Airport, Montreal.

► **Allison division, General Motors, has quietly hiked the rating on the latest production version of its T-38 turboprop engine to 3,000-shp. from the 2,750-shp. claimed for the original XT-38. And the end is not in sight. Later versions of the T-38 are expected to develop up to around 3,750-shp. The 3,000-hp. T-38s are now installed in the Convair Turboliner which continues testing at Edwards AFB, Muroc, Calif., and are scheduled to go into the three Convair T-29 navigation trainers with turboprop power, recently ordered by USAF.**

# Washington Roundup

## 143-Wing USAF: When?

A 143-wing Air Force program now seems to be a sure thing—but when?

The President has given his nod to this build-up beyond the current 95-wing goal. And Air Force is now rushing to make estimates for the Budget Bureau so that the program can be spelled out moneywise in the President's 1953 fiscal year budget message, due for submission to Congress before Jan. 15.

As far as funds go, this means:

• **A boost from the $22 billion** already voted to USAF for the current '52 fiscal year to approximately $26 billion. The $4-billion increase will be primarily for bases and planes.

• **An outlay of approximately $30 billion** for the '53 fiscal year starting next July and achievement of the full 143-wing strength by the end of the fiscal year, in mid 1953.

• **Level-off of around $22 billion** a year to sustain the 143-wing strength.

Of the 48 additional wings, the lion's share—probably around 28—will be tactical air wings. The emphasis in the remainder will be on air defense wings, meaning only a slight build-up in the strategic air arm.

For aircraft maunfacturers this means another round of contracts, probably over a six-month period starting next spring, largely for tactical fighters and bombers and interceptors.

**The fund-appropriating and contract-letting, though, will give the U. S. just a paper 143-wing USAF, unless prompt addition steps are taken.**

**If the bigger Air Force is to be in being by USAF's goal of mid-1953, output must be spurred—which means a bigger bite of materials for guns, less for butter.**

Policy on this is up to Defense Mobilization Director Charles Wilson and the President. They will weigh the economic and political impact of cutting back on washing machines and automobiles. And these considerations are likely to weigh heavily in 1952—a national election year.

The heart of the matter no longer seems to be "whether" there is to be a 143-wing Air Force program, but "when" there is to be a 143-wing Air Force The Administration still has to decide on that one.

## The New Door to Warfare

Top defense chiefs view the atomic-powered plane as "the stepping stone" to the satellite.

One comments: "If the nuclear-powered airplane works out, we are only one step away from the satellite."

Satellite warfare apparently was the "scientific warfare" senators had in mind when after conferences with defense chiefs, they cautiously talked of "scientific and technological advances, particularly in the field of electronics, opening a new door of scientific warfare not even imagined in World War II."

Their observations got lost in a lot of talk about "fantastic" new weapons in the fields of chemical, germ, atomic and guided missile warfare being readied for battlefield use. This, despite the fact that the senators referred only to a new "door," not a new weapon, explicitly said they didn't refer to chemical, germ, atomic or guided missile weapons.

The late Secretary of Defense James Forrestal envisioned 200 to 400 outerspace bases, circling the earth, with weapons to be launched from earth controls, as the ultimate in defense.

The fundamental hurdles to the project:

• **Powerplant and fuel** to drive the satellite beyond the sphere of gravity.

• **Navigation control** of the weapons stored on the satellite for sure-fire direction to earth targets.

On the prospects for the nuclear-powered plane:

• **Gordon Dean, Atomic Energy Commission's Chairman:** "I think in the next decade you will probably have a plane in the air, the power for which comes from a reactor."

• **Sen. Brien McMahon, chairman of the Joint Congressional Atomic Energy Committee:** "In picturing an atomic Army, and atomic Navy, and an atomic Air Force, I deliberately avoided any reference to the nuclear-powered aircraft. Such an aircraft, I believe, is feasible. It will become a reality in the future. But it is not sufficiently immediate—not near enough on the horizon—to be included in the picture. . . ."

• **A top USAF research and development spokesman:** In four to seven years, we'll know whether the atomic plane is feasible."

• **Dr. Harold Urey, top atomic scientist and consultant to AEC dissents:** "Atomic planes aren't important in the slightest. You have to carry too much valuable material in them. This is a toy . . . the Air Force is busy working on. They act like small children when it comes to this sort of thing. . . . You're not going to put (reactors) in automobiles either."

## Small Lines' Big Problem

Government financing of an economic plane for local service operations is out for the foreseeable future.

And Civil Aeronautics Board's Chairman Donald Nyrop has been gagged, can't continue to plump for the proposal—officially, at least.

**In a letter to Senate Interstate and Foreign Commerce Committee's chairman, Sen. Edwin Johnson, Nyrop had heartily urged legislation authorizing $8 million for development of a local plane.**

**It's the answer, he argued, to the problem facing the local carriers and the Board, in its effort to promote "a well-rounded air transportation system."**

Then the Budget Bureau clamped down and Nyrop wrote Johnson rescinding his endorsement of the legislation, explained he had been informed "it is not in accord with the program of the President."

The Board doesn't want to give the carriers permanent certificates, wants to "retain flexibility of route pattern" and because the carriers haven't got permanent certificates, banks and aircraft manufacturers won't finance a suitable shorthaul plane. The market may have disappeared before the plane comes off the production line.

So, the local lines have the problem of proving an economic operation with uneconomic equipment.

**Nyrop had also urged development of a helicopter for local service—a plan advocated by Sen. Harley Kilgore, chairman of the post office appropriations subcommittee.**

Kilgore's view: "Blanketing the country with helicopter services feeding into big trunkline points is the only answer to a sound air transportation system. Since helicopters can operate from cow pastures, it would cut down outlays for expensive airports."

—Katherine Johnsen

AVIATION WEEK VOL. 55, NO. 20
NOVEMBER 12, 1951

COMMON SCENE IN KOREA, a helicopter serving the troops, has increased the copter industry's hopes of a great commercial future.

# Copter Firms Reveal Commercial Plans

- **Military production now is taking all facilities and materials, so immediate civil output not in cards.**
- **But manufacturers, heartened by utility proved on battlefield, are getting future civil programs ready.**
- **Right now, Los Angeles Airways will be the guinea pig on developing copter passenger transport.**

By Alexander McSurely

Most U. S. helicopter manufacturers predict a rosy commercial future for their versatile air vehicles, as soon as they can take care of the growing military demand for rotary-wing aircraft in a variety of sizes and performance requirements.

But pressure of immediate military demands for 800 copters at an expenditure of over $200 million for fiscal 1952 is such that only a very few commercial helicopters probably will be produced in the near future, even if materials can be made available, which is doubtful.

A recent report of materials claims for civil aircraft, presented by federal civil aviation claimant agencies, called for materials to build only three types of civil helicopters:

• **Sikorsky.** Two S-55 helicopters, ordered by Los Angeles Airways.

• **McDonnell Aircraft.** Little Henry Model 79 ramjet helicopters, for crop-dusting work, scheduled to be produced at the rate of 12 a month, beginning next spring.

• **Bell.** Model 47D1 small helicopters for crop-dusting, scheduled to continue in production at the rate of one to two machines a month.

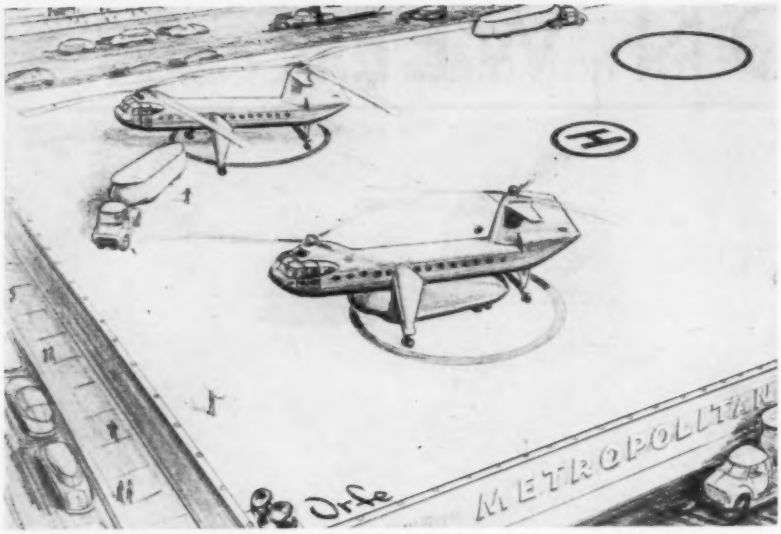
An AVIATION WEEK survey among the principal helicopter manufacturers in this country discloses no other helicopter scheduled for early commercial production. But, in the more distant months ahead, prospects are brighter for commercial versions of several other helicopters in sizes ranging up to 40-passenger capacity.

▶ **Guinea Pig**—Meanwhile federal civil aviation agencies appear to have settled on the plan of making Los Angeles Airways their principal guinea pig for commercial helicopter route development work and development of instrument flying, heliports, and other pre-requisites to large scale passenger transportation by copter.

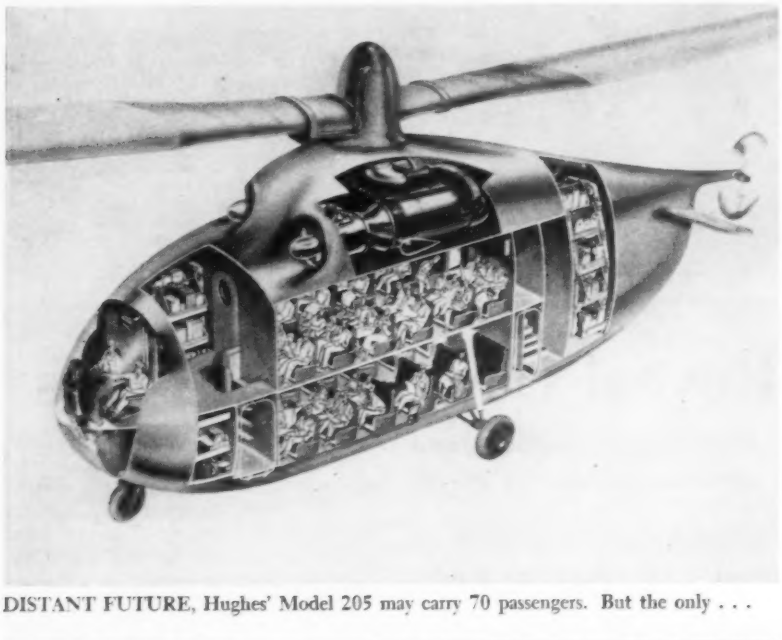
**The New York area helicopter route case which has been pending before CAB for more than a year is still hanging fire, with prospects dim for an early decision between the two applicants.**

Some observers predicted that the uncertain atmosphere surrounding the case indicated that the Board was not ready to favor either applicant, but would hold up the route development, on the grounds of higher military urgency for equipment.

▶ **Safety Experience**—Asked directly by




IN THE FUTURE, civil versions of Piasecki's XH-16 may be cargo carriers, and in . . .



DISTANT FUTURE, Hughes' Model 205 may carry 70 passengers. But the only . . .



PRESENT big copter that will see commercial service is S-55, now the AF H-19A.

AVIATION WEEK when a decision might be forthcoming, CAB Chairman Donald W. Nyrop replied with an indefinite, "pretty soon now."

Conservative attitude of CAA and CAB toward single-engine equipment for passenger operations is expected to be transferred over to helicopter requirements from fixed-wing plane requirements. It appeared likely that a twin-engine copter with safe single-engine performance would be almost a pre-requisite for any large scale passenger operation.

Good safety experience with the single-engine Sikorsky S-55 in first cargo operations, plus the ability of any commercially acceptable copter to set down easily with auto-rotation, may modify such a requirement.

**Most likely big copter project for commercial conversion in the distant future is the twin-engine Piasecki XH-16 which is nearing completion but several months from first flight.**

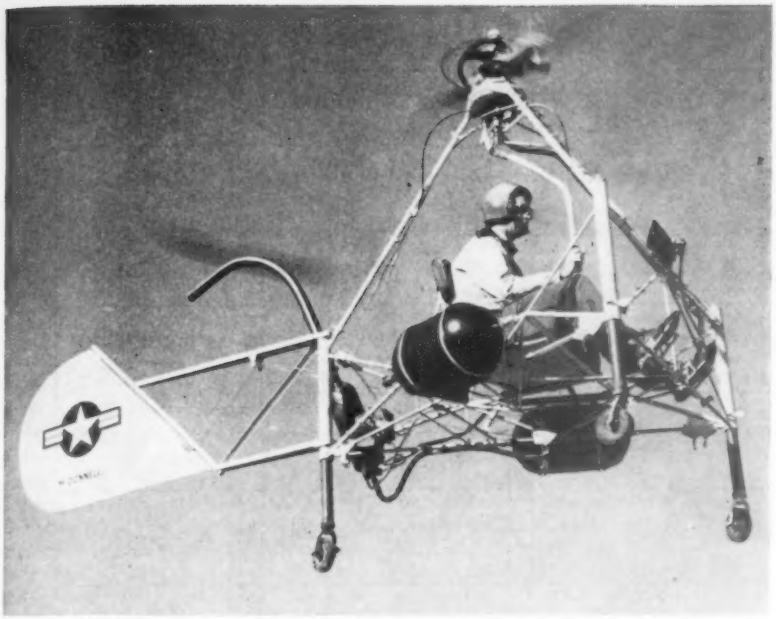
This craft has a fuselage the size of a DC-4, and in one long-legged landing gear version, will be capable of suspending a detachable pod for cargo, under its fuselage. Piasecki spokesmen are reticent about definite commercial prospects for this craft at the current early stage, but are undeniably hopeful. And if it can do the military job for which it is designed, it could do an equally important job in commercial use, expediting passengers or high priority commercial cargo over short distances in a tiny fraction of time now used by surface transportation, they pointed out.

▶ **Not Commercial**—Chances for a commercial development stemming from the big Hughes jet-rotored XH-17 copter appear less promising. An earlier study on a commercial version of somewhat similar craft, which could haul 70 passengers in a double-deck fuselage and about 200 mi. at 100 mph. was sent by Hughes Aircraft to the CAA as background for a recent general helicopter study.

But a Hughes spokesman says that the Model 205 is not projected for construction as a commercial craft at the present time and that the manufacturer is concentrating on its military work. Principal Hughes copter assignment now is to convert the test rig XH-17 into a full-fuselage flying article.

Here is a roundup of other principal helicopter manufacturers and their military products which may have later commercial applications:

• **Sikorsky.** In addition to the Model S-55 which carries up to 10 persons, and which is the commercial counterpart of the H-19A assault transport copter already in use in Korea, Sikorsky has under development a larger twin-engine assault transport with virtually a tandem rotor configuration, with a cabin of approximately DC-3 size. On



LITTLE HENRY, McDonnell's ramjet craft is surprise entry in agricultural market.

the basis of present reports from manufacturers, it appears that the S-55 will have the larger commercial copter field undisputed for at least the next year after the first model is delivered to LAA this month.

• **Bell.** When the new anti-submarine helicopter XHSL-1 flies down at Bell's new Ft. Worth helicopter division, early next year, it is expected to be a likely candidate for commercial transport conversion. Harvey Gaylord, Bell's vice-president in charge of the helicopter division, recently described it as a three-ton helicopter capable of carrying 20 at speeds close to 120 mph.

Competitive with the smaller Sikorsky S-55 is the Bell Model 48 with military designation of H-12, which has 8- to 10 place capacity. Bell originally designed this craft for a commercial version called the "Feederliner" (AVIATION WEEK Nov. 7, 1949, p. 42) but has never produced it commercially. Bell has had a small but steady sale of its little Model 47s for agricultural work and presumably will continue to produce these commercially, or a successor in about the same size.

• **Piasecki.** The relative newcomer Piasecki, has large military orders for two sizes of tandem helicopters, the H-21 which can carry up to 20 passengers in a commercial version, and the HUP, a smaller tandem which would be able to carry about six in a commercial version. These two machines both have future commercial promise, especially the large one. A third string for the Piasecki future commercial bow, is, of course, the prospect of a commercial adaptation of the XH-16 previously discussed.

• **McDonnell.** A turbine powered McDonnell helicopter, in the offing, and larger projections of the ramjet-powered Little Henry are the principal bids of McDonnell Aircraft for the helicopter future. No indication is offered as to what commercial planning is done for any other McDonnell models besides the Little Henry cropduster.

• **Hiller.** The ramjet-powered Hiller Hornet, announced as a two-place commercial craft but held up by pressure of military contracts, presumably will be the first Hiller bid for commercial business, and there is little indication as to what projections of this or conventional copters into larger commercial sizes are contemplated at this time. Meanwhile Hiller's conventional H-23 copters are being produced for Army and Navy.

• **Kaman.** A recent Navy contract for Kaman to install the small Boeing turbine as an experimental powerplant in a helicopter is being watched with interest and may eventually lead to more widespread use of the small turbines. Kaman also has Navy production contracts.

• **Doman.** The little-known Doman organization, of Danbury, Conn., started with a design, known as the Pelican, of a seven-place machine, went on to adapt it to a flying model built for Curtiss-Wright, and now has a newer and different craft under construction for the Army.

• **McCulloch Motors.** Another newcomer in the helicopter field, McCulloch's helicopter division, has a small Navy contract evaluation of its tandem rotor craft, presumably as a trainer. Its commercial future has not been spelled out.

## Northrop Doubles 1950 Gross Income

After showing a loss for several years, Northrop Aircraft staged a comeback into black ink for fiscal year ended July 31, showing a net profit of $3,276,052.94, after taxes, on gross income of $89,947,629.17, more than doubling fiscal year 1950 totals of $43,911,304.29.

No federal excess profits taxes were charged against the 1951 income, since a portion of previous losses incurred was allowed.

During the year, the company's backlog went to $300 million, highest in Northrop history; at July 31 it stood at $255 million. Major product at present is the two-seat, all-weather F-89 Scorpion jet fighter for the USAF, a few squadrons of which already are operational.

Northrop's employment has gone considerably beyond the 10,000-mark it set in World War II, with 14,500 now on the rolls.

Increased activity in the company's Special Weapons division necessitated a move to a new base for testing guided missiles at the USAF Long Range Proving Ground, Patrick AFB, Cocoa, Fla. Northrop also operates a test range installation at Holloman AFB, Alamogordo, N. M.

Among the firm's other activities is its Anaheim facility which will turn out optical range finders for Army tanks. A 250,000-sq. ft. building is under construction there. The Northrop Aeronautical Institute also is operating at capacity, training 1,000 students and several hundred USAF personnel in aircraft repair.

## How Effective Is Small Business Aid?

Dayton—A special committee of industrialists made Wright-Patterson AFB the first stop on a tour to determine effectiveness of the program to aid small business firms—those employing fewer than 500 persons.

The group was appointed in one of the final acts of John A. McCone, former Undersecretary for Air, and was accompanied to Dayton by Kennard Weddel, chief of the Office of Small Business, Deputy Chief of Staff, Materiel.

Members of the group include Louis Ruthenberg, chairman, Servel Corp.; Glen McDaniel, president, Radio and Television Manufacturers Assn.; Howard Williams, president, Washington Mills Abrasive Co. and head of the New England Small Business Assn.; and A. D. Plamondon, Jr., president, Industrial Steel Products.

# Civil Non-Carrier Aircraft Quotas—C-4 Program

| MODEL | WEIGHT | NO. | ENGINE MODEL | MFG. | 1951 4TH QUARTER | 1951 TOTAL | 1952 1ST QUARTER | 1952 2ND QUARTER | 1952 3RD QUARTER | 1952 4TH QUARTER | 1952 TOTAL | 1953 1ST QUARTER | 1953 2ND QUARTER | 1953 3RD QUARTER | 1953 4TH QUARTER | 1953 TOTAL | 1954 1ST QUARTER | 1954 TOTAL | GRAND TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Aero Design & Eng. Co.** | | | | | | | | | | | | | | | | | | | |
| L-3805 | 2,029 | 2 | 60-435-C 2 | LYC | 15 | 15 | 15 | 22 | 27 | 29 | 93 | 29 | 29 | 27 | 29 | 114 | 32 | 32 | 254 |
| **Beech** | | | | | | | | | | | | | | | | | | | |
| 35 | 1,024 | 1 | E-185-11 | CONT | 105 | 105 | 102 | 102 | 102 | 102 | 408 | 102 | 102 | 102 | 102 | 408 | 102 | 102 | 1,023 |
| 18 | 3,625 | 2 | R-985-AN14B | P&W | 12 | 12 | 12 | 12 | 12 | 12 | 48 | 12 | 12 | 12 | 12 | 48 | 12 | 12 | 120 |
| 50 | 2,490 | 2 | 60-435-C 2 | LYC | 5 | 5 | 12 | 30 | 36 | 36 | 114 | 36 | 36 | 36 | 36 | 144 | 36 | 36 | 299 |
| Total Beech | | | | | 122 | 122 | 126 | 144 | 150 | 150 | 570 | 150 | 150 | 150 | 150 | 600 | 150 | 150 | 1,442 |
| **Bell** | | | | | | | | | | | | | | | | | | | |
| 47-D1 | 1,002 | 1 | 604-200-032 | FR | 3 | 3 | 3 | 4 | 5 | 3 | 15 | 3 | 3 | 3 | 3 | 12 | 3 | 3 | 33 |
| **Bellanca** | | | | | | | | | | | | | | | | | | | |
| 14-19 | 961 | 1 | O-435-A | LYC | 12 | 12 | 12 | 12 | 12 | 12 | 48 | 12 | 12 | 12 | 12 | 48 | 12 | 12 | 120 |
| **Call** | | | | | | | | | | | | | | | | | | | |
| A-3 | 688 | 1 | C-125 | CONT | 3 | 3 | 3 | 3 | 3 | 3 | 12 | 3 | 3 | 3 | 3 | 12 | 3 | 3 | 30 |
| **Cessna** | | | | | | | | | | | | | | | | | | | |
| 170 | 706 | 1 | C-145-2 | CONT | 180 | 180 | 180 | 180 | 130 | 90 | 580 | 90 | 90 | 90 | 90 | 360 | 90 | 90 | 1,210 |
| 190 | 1,293 | 1 | W-670 | CONT | 20 | 20 | 24 | 24 | 24 | 24 | 96 | 18 | 15 | 15 | 15 | 63 | 15 | 15 | 194 |
| 180 | | | E-225-C | CONT | | | | | 30 | 90 | 120 | 120 | 120 | 120 | 120 | 480 | 120 | 120 | 720 |
| 310 | | | E-225-C | CONT | | | | | | | | | | 1 | 15 | 16 | 29 | 29 | 45 |
| Total Cessna | | | | | 200 | 200 | 204 | 204 | 184 | 204 | 796 | 228 | 225 | 226 | 240 | 919 | 254 | 254 | 2,169 |
| **Helio** | | | | | | | | | | | | | | | | | | | |
| H-391 | | 1 | 60-435-C 2 | 1 | | | 30 | 36 | 36 | 36 | 138 | 36 | 36 | 36 | 36 | 144 | 36 | 36 | 318 |
| **McDonnell** | | | | | | | | | | | | | | | | | | | |
| 79 | | | Jet | | | | | 32 | 36 | 36 | 104 | 36 | 36 | 36 | 36 | 144 | 36 | 36 | 284 |
| **Mooney** | | | | | | | | | | | | | | | | | | | |
| M-18-C | 313 | 1 | A-65-8 | CONT | 4 | 4 | 4 | 11 | 6 | 6 | 27 | 7 | 9 | 9 | 9 | 34 | 9 | 9 | 74 |
| M-18-L | 305 | 1 | O-145-B 2 | LYC | 5 | 5 | 4 | 11 | 6 | 6 | 27 | 6 | 9 | 9 | 9 | 33 | 9 | 9 | 74 |
| Total Mooney | | | | | 9 | 9 | 8 | 22 | 12 | 12 | 54 | 13 | 18 | 18 | 18 | 67 | 18 | 18 | 148 |
| **Piper** | | | | | | | | | | | | | | | | | | | |
| PA-18 | 574 | 1 | O-290-D | LYC | 155 | 155 | 150 | 163 | 174 | 174 | 661 | 174 | 174 | 174 | 174 | 696 | 174 | 174 | 1,686 |
| PA-20 | 643 | 1 | O-290-D 2 | LYC | 150 | 150 | 129 | 129 | 129 | 129 | 516 | 129 | 129 | 129 | 129 | 516 | 129 | 129 | 1,311 |
| Total Piper | | | | | 305 | 305 | 279 | 292 | 303 | 303 | 1,177 | 303 | 303 | 303 | 303 | 1,212 | 303 | 303 | 2,997 |
| **Regent** | | | | | | | | | | | | | | | | | | | |
| Rocket | | 1 | GO-435-C 2 | LYC | 9 | 9 | 22 | 24 | 27 | 25 | 98 | 25 | 25 | 27 | 25 | 102 | 22 | 22 | 231 |
| **Taylorcraft** | | | | | | | | | | | | | | | | | | | |
| 19 | | 1 | C-85-12F | CONT | 24 | 24 | 24 | 27 | 27 | 24 | 102 | 24 | 27 | 27 | 24 | 102 | 24 | 24 | 252 |
| 15 | | 1 | C-145 | CONT | 42 | 42 | 42 | 42 | 42 | 42 | 168 | 42 | 42 | 42 | 42 | 168 | 42 | 42 | 420 |
| Total Taylorcraft | | | | | 66 | 66 | 66 | 69 | 69 | 66 | 270 | 66 | 69 | 69 | 66 | 270 | 66 | 66 | 672 |
| Grand Total All Aircraft | | | | | 744 | 744 | 768 | 864 | 864 | 879 | 3,375 | 904 | 909 | 910 | 921 | 3,644 | 935 | 935 | 8,698 |

# How Many Civil Non-Carrier Craft?

**DPA Schedule C-4 sets quotas: 3,375 this year and 3,644 in 1953; but program is subject to revision.**

Defense Production Administration has approved increased production schedules for 12 manufacturers of civil non-carrier aircraft for business and farm use, starting Jan. 1.

DPA is scheduling production of 3,375 civil planes and copters next year and 3,644 in 1953, compared with only 2,682 this year. But these schedules are still under those requested for approval by the manufacturers.

A thirteenth plane maker, and one of the pioneers in light aircraft production, Aeronca Aircraft Corp., Middletown, Ohio, has advised government claimants for materials that it has terminated production of its tandem two-place Model 7 and its four-place sedan, due to requirements of its military contracts. Limited manufacture of Aeronca spares will be continued.

▶**Cut to Fit**—Air Coordinating Committee and DPA approved an average annual rate of 3,500 during the mobilization period. The manufacturers had asked an annual total of 4,550 non-carrier aircraft.

Civil Aeronautics Administration screened their claims down to fit the 3,500-aircraft rate for which DPA says it will grant controlled materials and priorities for "essential" use.

The low production rate of this year has been caused "by the free-market materials shortages during the first half of 1951" and the third-quarter temporary ceiling of 2,500 planes a year, CAA reports. But now DPA has granted materials to start the schedules shown (in table, p. 16) for the first quarter of next year (AVIATION WEEK Nov. 5, p. 79).

Included in the DPA-approved quotas are 18 different types of fixed-wing plane, a conventional Bell helicopter and the McDonnell ramjet copter Little Henry.

Here are tentative DPA-approved production quotas for each type of civil aircraft for the 2¼-year period from September of this year to March, 1954, totaling 8,698 aircraft for the period.

▶**Aero Design and Engineering.** 254 twin-engine Aero Commanders, with production schedule rising from five a month this year to about ten a month in 1953.

▶**Beech.** 1,023 Bonanzas scheduled at a steady 34 a month.

• 120 Twin Beeches at 4 a month.

• 299 Twin Bonanzas, rising from a current two a month to a steady 12 a month the second half of next year.

▶**Bell.** 33 helicopter 47-D1s, at one a month.

▶**Bellanca.** 120 Bellancas at four a month.

▶**Call.** 30 Call A-3 agricultural planes at one a month.

▶**Cessna.** 1,210 Cessna 170s at 60 a month to July, 1952, and 30 a month thereafter.

• 194 Cessna 190s at eight a month to the end of next year and five a month thereafter.

• 720 of the new Cessna 180s starting in production in fall, 1952, rising to 40 a month from 1953 on.

• 45 new-design Cessna 310s, slated to start production last quarter of 1953.

▶**Helio.** 318 of the new Helioplane 391s, at 12 a month starting early 1952.

▶**McDonnell.** 284 ramjet Little Henry helicopters, starting production the second quarter of next year at 12 a month.

▶**Mooney.** 74 M-18-Cs with Continental engine, rising to two a month next year and three a month thereafter.

• 74 M-18-Ls with Lycoming engine on equal schedule.

▶**Piper.** 1,686 Super Cubs, rising from present 50 a month to a steady 58 a month after the second quarter next year.

• 1,311 Paces at 43 a month.

▶**Regent.** 231 four-place rockets, rising to nine a month second half of next year and tapering to about seven a month first quarter of 1954.

▶**Taylorcraft.** 252 two-place T-19s at nine a month.

• 420 four-place T-15s at 14 a month.

These are not firm delivery schedules. They are government-approved quotas. Some manufacturers may make more aircraft than their quota if sales demand is strong and they can get enough extra materials on special exchanges with less fortunate manufacturers or from inventory. Also, some manufacturers may not come up to their approved schedules, and not use their quotas.

Next quarter CAA, ACC and DPA will replace the so-called C-4 schedule shown here with a new C-5 program. The programs are revised and reconsidered quarterly.

## How GE Shares AF Jet Engine Dollars

Sixty cents of every dollar General Electric received from the USAF for jet engines during the past year went to its 4,070 suppliers for components, materials and services. The suppliers are located in 41 states and the District of Columbia.

A report to the Air Force, based on a three-month survey GE made covering 2,600 of its suppliers, showed 82% of the vendors fell into the small business category. Of the 2,600 questionnaires sent out, GE received 907 replies—734 from firms employing fewer than 500, and 173 from those with more than 500 workers. In turn, it is noted, 429 of the 907 companies reporting said they did business with a total of 49,488 organizations classified as small business and 16,039 larger concerns.

There is some difficulty in consistent reporting of a company's size. For example, a firm may be considered in the small business class prior to receiving a GE contract, but hires more people to fill the order and climbs out of the classification. Aeronca at Middletown, Ohio formerly was in the 500-or-less-employes class, but to fill a GE contract for inlet screens, employment went to 747.

## Extra Power-on Aid to Hovering Copter

(*McGraw-Hill World News*)

**San Jose, Costa Rica**—An interesting operational trick-of-the-trade for helicopter operation and one that meant throwing the book out the window was evolved by the crew of a USAF Air Rescue Sikorsky H-5E (S-51) assigned to help combat a yellow fever epidemic which hit this island recently.

Keeping plenty of power on while hovering, even if it meant over-riding the tachometer redline, was a technique pilot Capt. John R. Peacock learned early in the game. The reason: sudden air currents which dissipated the ground cushion effect and tended to overturn the H-5E.

The safe limit is supposed to be 2,300 engine rpm., but Capt. Peacock says he found it necessary to go to 2,450 rpm., to be certain of maintaining a "hover". Once while the captain was hovering, a current took away his ground cushion and the copter suddenly lurched downward stoving in the Plexiglas nosepiece. But with his extra power, he pulled up and away.

Captain Peacock also likes the H-5s performance in heavy air. He never flew above 1,750 ft. during the whole spraying operation, staying mostly between 300-700 ft. above sea level.

He thought, however, that pilot visibility, straight downward on the H-5 left a lot to be desired. The pilot sits in the rear seat and therefore cannot get a vertical view of the ground while landing. But, later Sikorskys are remedying this disadvantage, he said.

# Planes on Loan

**● AF, Navy come to aid of suppliers with 344 craft for use in public interest.**

**● Airlines also may borrow units for cargo purposes under leasing policies.**

U. S. Air Force and Navy have 344 airplanes loaned out to various manufacturers, researchers, airlines and other companies for experimental and other uses in the public interest, figures just released to AVIATION WEEK revealed.

Planes now on loan, including 295 USAF aircraft and 49 Navy planes, are estimated to be sufficient to provide airlift for seven troop carrier groups.

While at first glance this seems a very large number of planes taken from strictly military usage, they provide many worthwhile services. And a number of the planes on loan are obsolescent types which would not be in use otherwise, and probably would be scrapped.

► **From Moth Balls**—For example, most major engine manufacturers operate World War II bomber flying test beds as aerial platforms from which to test their new experimental jet engines. Pratt & Whitney Aircraft division of United Aircraft Corp., for instance, is running a high priority flight test program on its new J-57 axial flow turbojet engine, possibly the most powerful in the new generation of powerplants now in development.

This is accomplished by suspending the jet engine from the bomb bay of a Boeing B-29 in flight. Another Pratt & Whitney flight test program uses a USAF Boeing B-17 to fly the T-34 turboprop engine. This plane mounts the turboprop in the nose in the space formerly occupied by the bombardier and his equipment.

Other major engine and propeller manufacturers have similar military aircraft engine test beds.

► **Two Type Loans**—Air Force and Navy planes on loan to civil users are controlled under two separate type loans—lease and bailment. Air Force currently has 136 aircraft of all types on bailment to civilian users, and the Navy 20. Under terms of the other type agreement USAF is leasing out 159 aircraft and Navy 29.

Air Force and Navy contractors are eligible for military-owned aircraft for test purposes and planes are leased to private operators under provisions of Public Law 364, 81st Congress.

Contractors needing military aircraft for test of experimental purposes in connection with airframe, engine, or equipment development work, or projects in the national interest, generally receive them under bailment.

Private operators such as airlines can lease planes if it is determined the lease would be in the public interest and the aircraft are not needed for immediate military use.

► **Bailment Procedure**—Bailment contracts provide for transfer of planes by the Air Force or the Navy to a contractor if he guarantees that they will be used by him for the benefit of the military service involved. The agreement also sets out terms for return of the plane.

Under this contract, the bailee normally is required to furnish fuel, equipment, crews, engineering and maintenance.

Inspection of the plane must be performed in accordance with military regulations. Records, reports and tech orders must be complied with. In addition the contractor agrees that the government has access to the plane at all times and that it will be used only for the agreed test program.

The planes on bail may not be flown outside the continental limits of the United States without specific agreement with the government. The company is liable for loss, damage or destruction of the aircraft due to negligence.

► **Lease Procedure**—Under limited and sometimes complex conditions the Air Force and Navy also will loan cargo planes under lease agreement to Civil Aeronautics Board—authorized airlines.

Lease agreements set out that the aircraft involved are to be used in connection with authorized carrier operations and that they will not be subleased. The lessee further agrees that he will return the aircraft in its original configuration to the military service and that it will be maintained in accordance with CAA specifications and standards.

In addition, the lessee is held liable for damage up to a maximum liability established in the lease instrument. Air Force and Navy prohibit extended operations outside the continental U.S. and the lessee agrees that the aircraft will be returned upon demand.

Further, the lessee agrees to provide within 48 hours aircraft and crews to perform Air Force missions in accordance with military airlift contracts which would be negotiated at a later time if required to meet a military requirement.

# Steel Slash Kills Building Plans

U. S. civil and joint military-civil airports and maintenance bases are being forced to make radical changes in building plans for hangars, maintenance shops, airport towers and terminal buildings. Reason is that Defense Production Administration has slashed structural steel allotments claimed by Civil Aeronautics Administration for the fourth quarter of this year and is expected to continue cutting them back.

CAA claimed requirements of 29,729 tons of carbon steel for civil aviation building for January-March, 1952. Of that, 17,386 tons are structural. This allotment request was awaiting DPA action last week. Outlook is that the steel supply situation will remain tough all over next year.

So some programs are shelved, others delayed, while architects redesign structures to use far less steel, especially structural steel. Most civil aviation buildings are now going from structural steel to reinforced concrete, cinderblock and wood construction.

► **Cutback effects**—CAA estimated civil aviation construction would need 8,000 tons of carbon steel for construction for the October-December period this year, 3,250 tons being structural steel. DPA allotted 6,150 tons, including only 1,000 tons structural.

Here are five examples of what happened when CAA had to allocate its reduced steel allotment to projects with highest importance.

● **Dallas.** Big new control tower planned, with radar and communications to take care of increased Air Force and Army flying and increased airline traffic, required 46½ tons, 34 tons of it structural. Cutback forced CAA to turn down the whole project.

● **Beaumont.** Control tower, weather bureau, CAA communications and control office and facilities, terminal building, airline office and passenger space required 80 tons of steel. Steel was denied, although Beaumont is the growing center of one of the world's biggest oil refining districts.

● **Midland, Tex.** Control tower mostly for Air Force traffic, requires 49½ tons. All action was denied although there is no tower there now.

● **Miami.** National Airlines needs a new maintenance building badly, as traffic is already up 50% and new equipment is on order. Maintenance facility would require 594 tons of steel, 565 tons of it structural, but the steel was denied.

● **San Francisco.** United Air Lines saw the steel shortage coming some time ago and completely redesigned its SF maintenance base program, cutting its structural steel requirements for the fourth quarter from 350 tons to 214 tons of structural steel. But the application was nevertheless denied for all 214 tons. United's base expansion is important to any Pacific airlift build-up.

All the above cases are now being appealed by CAA to DPA.

# How to add machining capacity without adding machines

YOUR machine tools become more productive when you use Timken® seamless tubing instead of bar stock for hollow cylindrical parts. Timken tubing has the center hole already there. Drilling is eliminated. Finished boring is often your first production step. As a result, screw machine stations are released for other operations.

You save steel, too, by using seamless tubing. Since the hole is already there, there's less metal that has to be machined away. You get more parts per ton of steel. And to further assure savings in material, the Timken Company provides a tube engineering service which recommends the most economical tube size for your job—*guaranteed* to clean up.

All this and better quality too! Because the piercing process by which Timken seamless tubing is made is basically a forging operation, you have fine forged quality in your product—greater strength and toughness. And from tube to tube and heat to heat, this quality is always uniform. It's rigidly checked at every step in production. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

**YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH**

**TIMKEN**

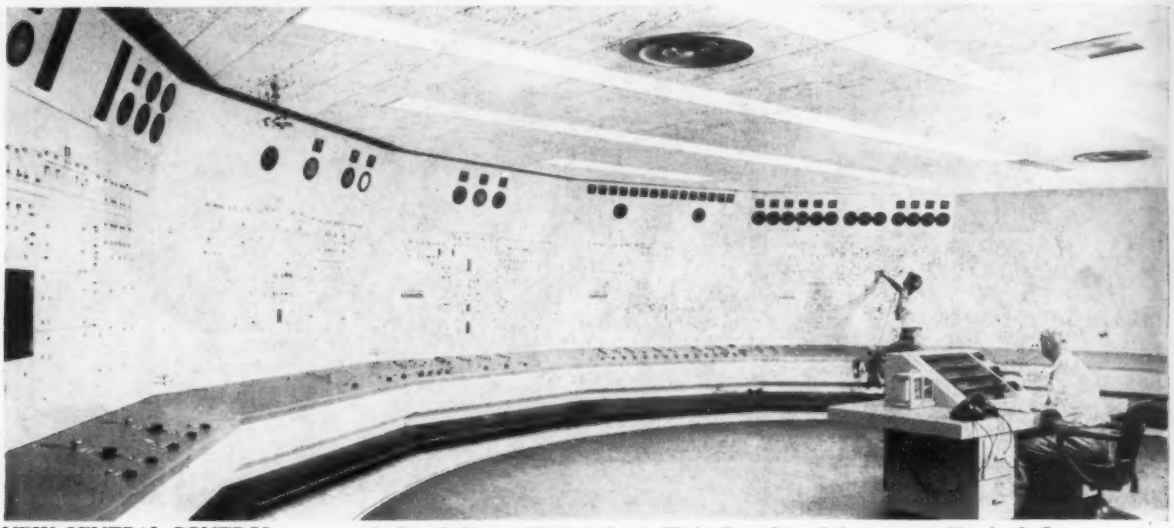
TRADE-MARK REG. U.S. PAT. OFF.

***Fine Alloy***

**STEEL**

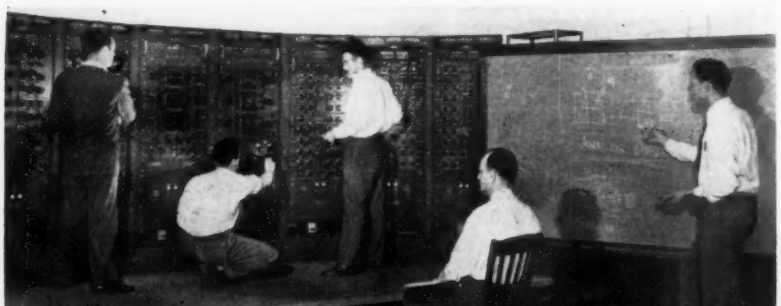
***and Seamless Tubes***

*Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.*

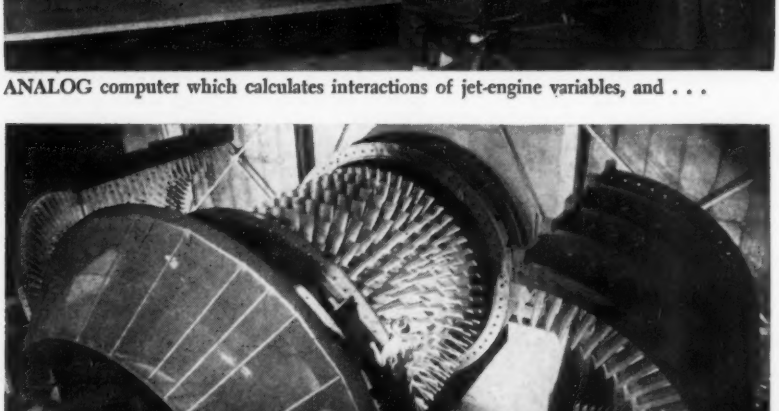


NEW CENTRAL CONTROL room speeds data finding at NACA's Lewis Flight Propulsion Laboratory at Cleveland, O.

# NACA Seeks Answers to Mach 3.5 Speeds



ANALOG computer which calculates interactions of jet-engine variables, and . . .



NEW 956-BLADE, seven-stage, 87,000 hp. compressor for supersonic windtunnel.

**● New tunnel will test 100,000-lb. thrust ramjets.**

**● But problem is present efficiency losses.**

By Irving Stone

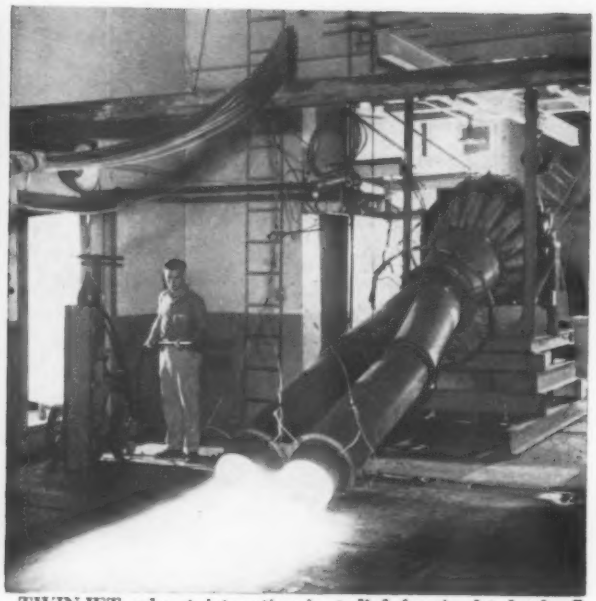
Three phases of concentrated research are being stressed at the National Advisory Committee for Aeronautics' Lewis Flight Propulsion Laboratory to insure that U. S. engine progress will never lag. These fields of research are:

- **Long-range** programs which will bear fruit in future years.
- **Shorter-range** investigations for applying results to production airplanes in the next few years.
- **Immediate** studies aimed at current problems.

NACA is taking propulsion theory, fusing it with experimental research and translating the integrated findings into sound engineering applications for today's and tomorrow's highspeed planes and missiles. One specific dividend of the laboratory's programs is the cutting down of time normally required for turning an idea into fact. What formerly might take a year for this translation is now a matter of weeks.

▶ **Largest Tunnel Soon**—The potential of the Lewis Lab's efforts was indicated by one research highlight announced at a press conference following the

RAMJET engine for missile is tested in world's largest windtunnel.



TWIN-JET exhaust interaction is studied for simulated takeoff.

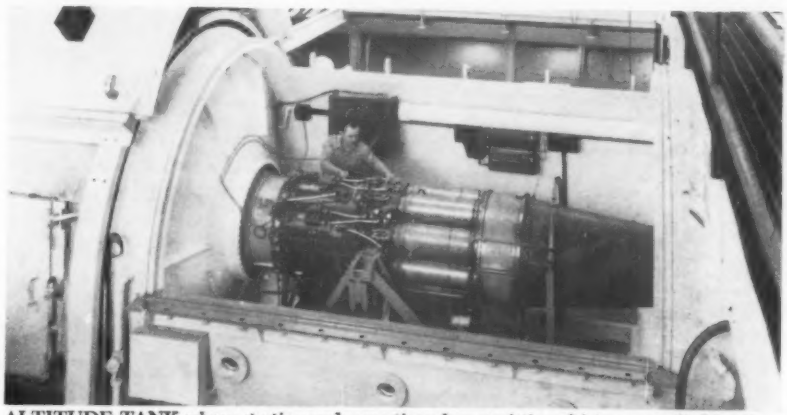
close of a recent inspection tour of the Cleveland facilities by more than 1,200 representatives of the aviation industry, the military, universities and the press (AVIATION WEEK Oct. 22, p. 16).

This is a new supersonic tunnel costing $34 million and being pushed for completion next summer. It will be the world's largest, even exceeding the capabilities of the laboratory's present 8 x 6-ft. testing facility. It will accommodate large-diameter, long-range ramjets developing well over 100,000 lb. thrust (more than 5,000 lb./sq. ft. of frontal area) at Mach 3.5 at 40,000 ft.

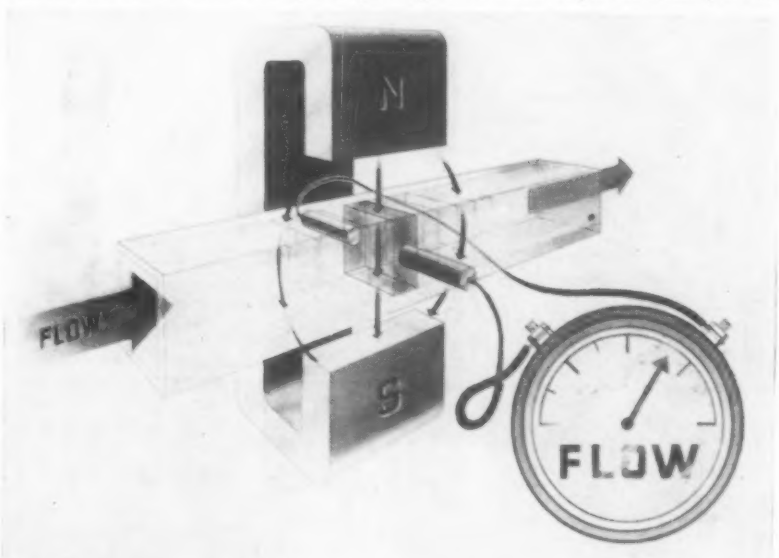
Meanwhile, Lewis Lab engineers are using the 8 x 6-ft. tunnel to unravel associated propulsion problems of missiles and aircraft at speeds up to Mach 2. One of the problems under study is the relationship between engine thrust and inlet pressure loss. How serious this can be is pointed up by the fact that a 25% pressure loss between the freestream and the combustion chamber inlet will result in a 35% thrust reduction.

▸**Inlet Studies**—Some pressure losses are to be expected, but NACA has tackled the inlet problem and has come up with data for air intake designs that will allow good engine thrust at twice sonic speed—at zero angle of attack. But with change in angle of attack, the pressure-thrust relationship is altered. Thus, if a missile's angle of attack is increased to 20%, pressure losses would be sufficiently substantial to cause a drop in thrust to 70% of engine power at zero angle of attack.

Another aggravating factor affecting engine location is caused by placement of the horizontal controls on the nose of the missile to avoid effects of wing



ALTITUDE TANK where starting and operating characteristics of jets are studied, and . . .




ELECTRONIC flow meter which measures from outside the rates of flow within conduit.

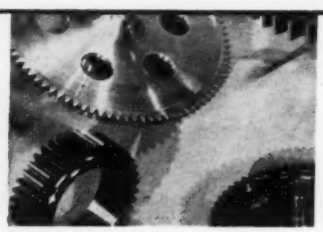
**VINCO IS HANDLING HIS GEARING PROBLEMS**

Not a gear worry will mar the pleasure of this man's hunt. Vinco "Metalworking Wisdom" is the result of more than 25 years of doing the "unusual." Whether it's aircraft engine gears requiring unbelievably close tolerances, or so-called "commercial" gears having wide tolerances, Vinco can give better quality at a lower cost.

**VINCO CORPORATION**
**9111 SCHAEFER HIGHWAY**
**DETROIT 28, MICHIGAN**

Mass Production of Parts and Assemblies
Gears
Splines
Engineering
Designing

The Trademark of Dependability



VINCO

MILLIONTHS OF AN INCH FOR SALE

wake and tailpipe heat condition. Deflection of the controls during maneuvers breaks up the uniform supersonic flow field. Trailing back to the inlet of the buried engine, the resulting disturbances can seriously cut power output.

Another consideration to cut thrust losses with the engine installation submerged in the missile fuselage is adequate removal of boundary layer that forms along the fuselage surface ahead of the inlet. When the buried engine can't be positioned to avoid the boundary layer condition, removal of the layer is necessary.

NACA engineers are ferreting out the answers for the best compromise in a fixed removal system and also are working on an adjustable scoop that shows promise for efficient layer removal. This is an arrangement with a movable ramp ahead of the inlet with bleed aft of the inlet for dumping the low-energy air overboard. The scoop is now adjustable for a specific tunnel condition, but one NACA research scientist said that the aim is to make the operation automatic to accommodate various flight conditions.

► **Air-Cooled Thermocouple** — In NACA's propulsion research, new instrumentation constantly is being devised to keep pace with changing operating conditions. And special equipment is required for rapid reduction to suitable form of the tremendous quantity of test data recorded.

For example, the conventional thermocouple's lag is too great to cope with rapidly fluctuating temperature changes, it is not sufficiently rugged, and its limiting operating temperature already has been exceeded in current research.

Increasing the mechanical strength of the unit alone boosts the response lag, so NACA has solved the problem by introducing an electrical lag compensator, thus making it possible to ruggedize the thermocouple and still get fast, accurate measurements. Actually, the compensator senses the gas temperature ahead of the thermocouple.

To deal with the gas temperatures in the higher brackets, as in afterburner research, Lewis Lab technicians have devised a thermocouple cooling scheme. The amount of cooling air, fed to the base of the instrument through tiny tubes to maintain a constant temperature and prevent melting, is carefully measured and with this information the temperatures in the engine can be computed.

► **Fuel Flow Accuracy**—Unsteady combustion is one of the researcher's plagues in rocket engine operation. It introduces rapid burnout and broken fuel lines. At best, instability con-

**DEPENDABILITY**

**...LINKED IN LEADERSHIP**

EASTERN

LOCKHEED

CURTISS-WRIGHT

...to project [illegible]ed dependability into higher [illegible]nce brackets

...to maintain the highest standards of air travel comfort

...to extend period of maximum returns on capital investment

**EASTERN AIR LINES**

**has established the World's Largest Fleet of Lockheed New-Type and Super Constellation transports powered by Wright Cyclone 18 and Turbo Compound engines.**

The built-in future of this Great-er Silver Fleet will progressively provide...

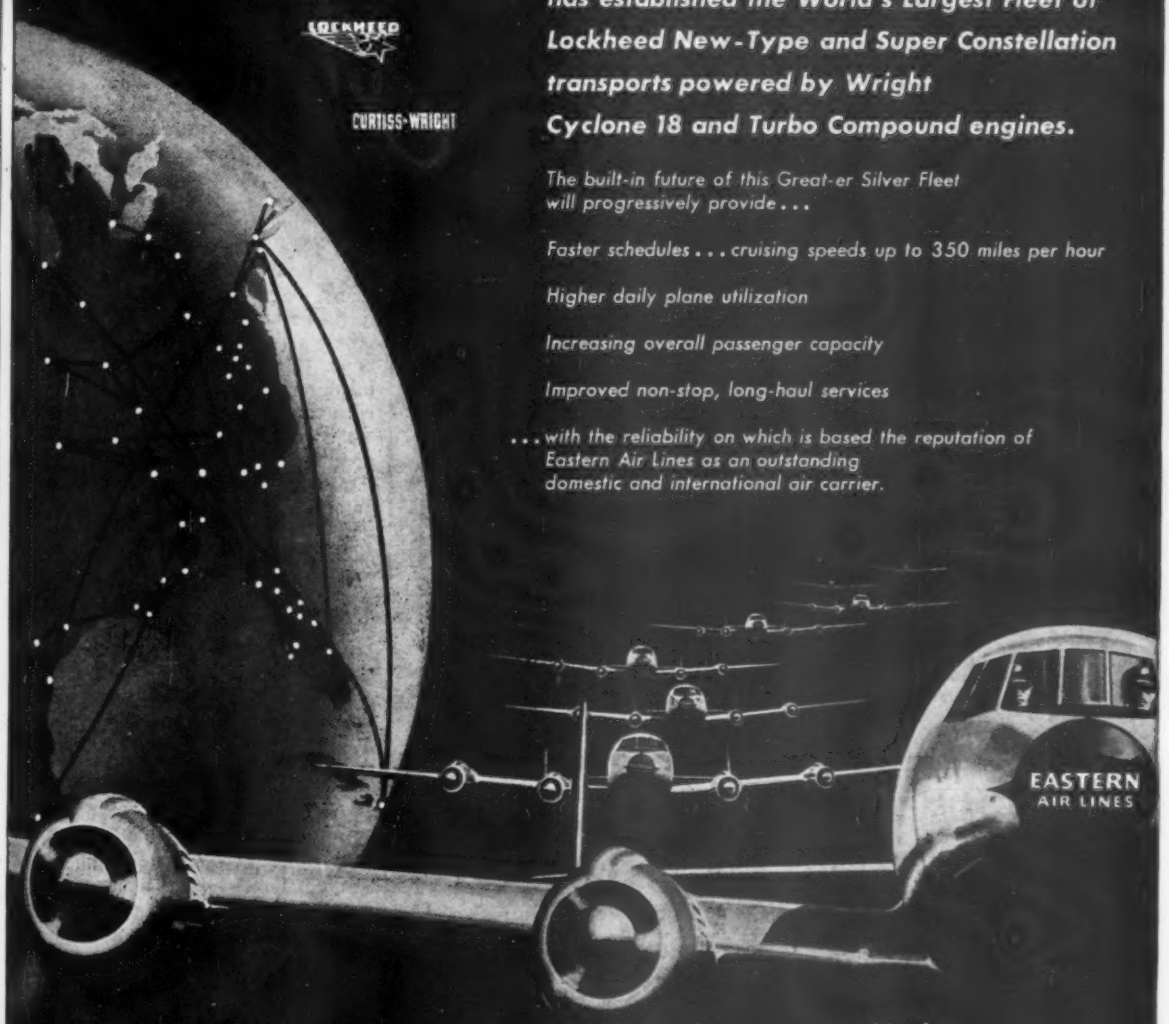
Faster schedules... cruising speeds up to 350 miles per hour

Higher daily plane utilization

Increasing overall passenger capacity

Improved non-stop, long-haul services

...with the reliability on which is based the reputation of Eastern Air Lines as an outstanding domestic and international air carrier.




**WRIGHT** AIRCRAFT ENGINES

PRODUCTS OF **CURTISS-WRIGHT**

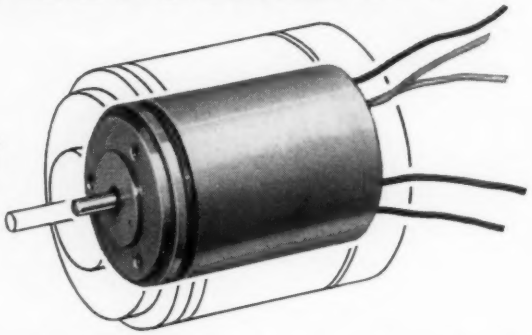
*The World's Finest Aircraft Engines*

WOOD-RIDGE, NEW JERSEY

# ECLIPSE-PIONEER

## Announces the New Line of

# PYGMY SYNCHROS



Size of pygmy as compared to AY-200 series outline

Eclipse-Pioneer has added a tiny new member to its great family of famous Autosyn* synchros. It's the new AY-500 series, a precision-built pygmy weighing only 1¾ oz. while scaling only 1.278" long and .937" in diameter (the same diameter, incidentally, as a twenty-five cent piece). Its accuracy and dependability are assured, thanks to Eclipse-Pioneer's 17 years of experience and leadership in the development of high precision synchros for aircraft, marine and industrial applications. For more detailed information on the AY-500 and other E-P Autosyns, such as the remarkably accurate AY-200 series (guaranteed accuracy to within 15 minutes on all production units), please write direct to Eclipse-Pioneer, Teterboro, N. J.

*REG. TRADE MARK BENDIX AVIATION CORPORATION

LOOK FOR THE PIONEER MARK OF QUALITY REG. U.S. PAT. OFF.

### Typical Performance Characteristics

| | One AY-201-3 Driving | | One AY-500-3 Driving |
|---|---|---|---|
| | One AY-500-3 Control Transformer | Two AY-500-3 Control Transformers | One AY-500-3 Control Transformer |
| **INPUT** | | | |
| Voltage | 26-volts, single-phase | 26-volts, single-phase | 26-volts, single-phase |
| Frequency | 400 cycles | 400 cycles | 400 cycles |
| Current | 88 milliamperes | 110 milliamperes | 55 milliamperes |
| Power | 0.8 watts | 1.2 watts | 0.9 watts |
| Impedance | 105+j280 ohms | 100+j220 ohms | 290+j370 ohms |
| **OUTPUT** | | | |
| Voltage Max. (rotor output) | 17.9 volts | 16.2 volts | 14.1 volts |
| Voltage at null | 40 millivolts | 40 millivolts | 40 millivolts |
| Sensitivity | 310 millivolts/degree | 280 millivolts/degree | 245 millivolts/degree |
| Voltage phase shift | 23 degrees | 26 degrees | 44 degrees |
| System accuracy (max. possible spread) | 0.6 degrees | 0.6 degrees | 0.75 degrees |

**Other E-P precision components for servo mechanism and computing equipment:**

**Servo motors and systems • rate generators • gyros • stabilization equipment • turbine power supplies • remote indicating-transmitting systems and special purpose electron tubes.**

*For detailed information, write to Dept. H*

**ECLIPSE-PIONEER DIVISION of** Bendix AVIATION CORPORATION

**TETERBORO, NEW JERSEY**

**Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, N. Y.**


tributes to high efficiency losses. Rate of fuel flow is one of the factors affecting the condition, and because the lab technicians couldn't get sufficient accuracy of measurement with available flowmeters, they developed an electromagnetic device that gives rapid response to flow rate variations.

An electromagnetic field set up in the flow path is varied by the quantity of liquid passing through the pipe. Flush-fitting electrodes in the magnetic field sense flux changes and send the response to an indicator. At this point of development, the instrument will measure flow rates of alcohol, acids, water, and acetone. Further development is expected to allow flow measurements of hydrocarbon fuels.

▶ **Fast Answers**—Data reduction from the myriad of test readings has been a mounting headache. One example is the towering manometer boards of which photos were taken, read under a magnifying glass, data recorded and calculations performed. Considering that as many as 5,000 pressure readings might be taken in a single test run, the processing manpower involved would be considerable—perhaps as high as 100 manhours for the data obtained in the lab in an average day.

An initial step to speed up the recording and reduction of measurements has involved the use of punch card machines but the manual operations required in getting the data onto the cards has been a problem.

Now NACA has found a solution in automatic equipment. Electronic computers take the mass of pressure and temperature readings and transform this data onto both typed reference sheets and perforated tapes and finally to punch cards for the lab technician. It is only a matter of minutes after the end of the run before desired information is available. The procedure will tie in handily for the additional mass of data coming out of new NACA supersonic facilities now under construction.

▶ **Shop Aids Design**—An important activity at the Lewis Lab is compressor research. Somewhere along the line, a halt must be called on the theoretical work to establish validity of the concepts involved by experimental proof. This is particularly true with compressor blading. To give the designer what he wants, NACA has set up an efficient shop scheme incorporating special and commercial machines. This activity speeds fabrication of the various blade configurations for quick experimental evaluation, and points up NACA's self-sufficiency.

Technicians at the lab have been producing master blade templates for the fabrication of the small airfoils. Basic reference is a magnified drawing

# More jets sooner...

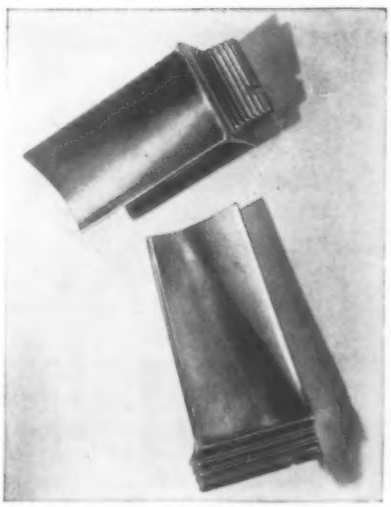
## BECAUSE WE FORGED A 64th INTO 3-THOUSANDTHS

In making forgings, a shop is doing mighty well when it can turn out forgings within 1/64th of an inch of the right dimension . . . our Jet Division is forging buckets for jet-engine turbines to a tolerance of 0.003", day and night, to get more jet engines built in less time.

These Thompson ultra-high precision forgings require only a finish-polish to make the airfoil section ready to go to work turning hot gases into power. There's no time-consuming machining of the complex surfaces on elaborate machines.

Precision forging is but one of the ways Thompson produces blades and buckets. To meet individual customer requirements, we can cast, machine, or use powder-metallurgy processes to turn out parts for all types of jet engines. We also have a large share in manufacturing parts and complete assemblies for jet engines.

The military air services have learned that "you can count on Thompson" . . . it's leadership that *you* can always count on in devising better ways to make many types of high-precision parts economically.



Heat-Resisting Turbine Buckets made by the Thompson Precision Forging Method

**JET DIVISION**

**Thompson Products, Inc.**

Euclid, Ohio; Harrisburg and Danville, Penna.

*YOU CAN COUNT ON THOMPSON FOR ENGINEERING LEADERSHIP*

# FROM Jennies TO Jets IN 23 YEARS

## Pacific Airmotive

# AIRCRAFT MAINTENANCE

**TODAY AS YESTERYEAR** PAC offers you the service and "Know-How" of over 3,000 experienced craftsmen and technicians . . . many of whom have 20 years or more in Overhaul and Maintenance.

**STEADY GROWTH** PAC's streamlined Service adds an ever growing list of satisfied Aircraft Operators in the foreign, domestic, private and corporate field.

**"ONE-STOP SERVICE"** PAC is the nation's oldest and largest Maintenance Base, comprising almost 20 acres dedicated to Aircraft Service. The more than thirty departments at PAC specializing in every phase of parts and accessories, assure finest precision and "Know-How" all along the line of PAC's "One-Stop Service". And, PAC is the first and largest distributor of Pratt & Whitney Engine Parts.

Better check with PAC for attractive "Packaged Prices" backed with a 23-year-old reputation for quality and precision. Write or call today for complete information.

**PACIFIC AIRMOTIVE CORP.**

**BURBANK, CALIFORNIA**

PAC

**KEEPS 'EM FLYING**

*Other Divisions: Oakland and Chino, Calif. • Seattle, Wash., Kansas City, Kan., and Linden, N.J.*

of a blade section from which a specially developed machine reproduces the desired form in thin metal. Several such sections along the blade are machined in this manner and, assembled in the order of progression, they make up the master template for the entire blade.

This scheme has been carried further and the need for templates is now eliminated. Blade dimensions are fed to an electronic tabulator which automatically guides the machining of the blade section, sharply cutting production time. This gives a two-dimensional relationship and Lewis Lab technicians hope to extend the process to include twist, so the entire form can be produced directly from tip to root.

▶**Central Control Room**—Altitude facilities and other test installations at the Lewis Lab are handled by a pinpointing central control system. Here, air supplies and engine exhausts are directed for more than 100 test points, many of which may be running simultaneously. Extent of the operations is indicated by conditions in the 8 x 6-ft. supersonic tunnel, where current USAF jets have been tested to an altitude of 65,000 ft. at Mach 2, and ramjets have been brought to 80,000 ft.

The "situation" panel in the central control room extends along the walls for easy determination of the condition at each test point. Lines indicate the maze of piping connections and colored lights show whether the various facilities are ready for a run, are receiving air, or have finished the test. A simple arrangement of switches, meters, and intercom services complete the control setup.

It represents a masterpiece of service coordination and shows that the complexity of test equipment can be handled by planned, simple controls.

In other fields of research, other advances indicated are associated with:

• **Afterburning.** After five years study at the Lewis Lab, tailpipe burning has been brought to a point of use where it will more than double the thrust of the engine at supersonic speeds, with only a slight increase in the weight and size of the powerplant. Much work still remains to be done to boost economy and reliability of the afterburner. Cooling of the burner shell is one problem now under study.

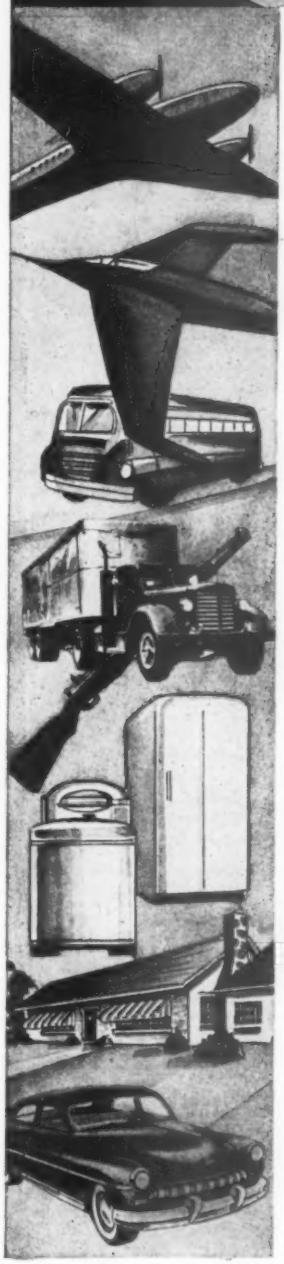
• **Cooling.** Temperature control for turbine blades and disks, and related improvements, has shown that a 5,000-lb.-thrust engine can be boosted to a 7,000-lb. or higher value. NACA has been working with certain manufacturers for the past two years on turbine cooling and some of these have included the new ideas in their designs. (AVIATION WEEK Oct. 22, p. 16).

• **Icing.** Research in this category has


CHEMICALS ACP PROCESSES

phosphate coating chemicals

TO MAKE YOUR PRODUCT DURABLE



**PAINT BONDING**

"GRANODINE"® forms a zinc-iron phosphate-coating bond on sheet metal products—automobile bodies and fenders, refrigerator cabinets, etc.—for a durable, lustrous paint finish.

"LITHOFORM"® makes paint stick to galvanized iron and other zinc and cadmium surfaces.

"ALODINE",® the new ACP protective coating chemical for aluminum, anchors the paint finish and protects the metal.

**RUST PROOFING**

"PERMADINE",® a zinc phosphate coating chemical, forms on steel an oil-adsorptive coating which bonds rust-inhibiting oils such as "Granoleum."

"THERMOIL-GRANODINE"® a manganese-iron phosphate coating chemical, forms on steel a dense crystalline coating which, when oiled or painted, inhibits corrosion.

**PROTECTION FOR FRICTION SURFACES**

The oiled "THERMOIL-GRANODINE" coating on pistons, piston rings, cranks, camshafts and other rubbing parts, allows safe break-in operation, eliminates metal-to-metal contact, maintains lubrication and reduces the danger of scuffing, scoring, galling, welding and tearing.

**IMPROVED DRAWING AND COLD FORMING**

"GRANODRAW"® forms on pickled surfaces a tightly-bound adherent, zinc-iron phosphate coating which facilitates the cold mechanical deformation of steel, improves drawing, and lengthens die life.

*Send for descriptive folders and Government specifications chart on the above chemicals. Write or call for more information on these products, and advice on your own metal-working problem.*

Pioneering Research and Development Since 1914

**AMERICAN CHEMICAL PAINT COMPANY**

AMBLER, PA.

*Manufacturers of Metallurgical, Agricultural and Pharmaceutical Chemicals*

**when you want tools fast**

**....Phone your nearby Snap-on factory branch**

● You'll talk to a *tool man* when you get your Snap-on branch on the wire. He'll understand your wants clearly, and help you select the most efficient tools for your needs. You'll get professional tools of the finest character — properly designed, strong, versatile, *safe,* Snap-on Tools—that will serve you long and well. For 30 years, plants—large and small—have used and endorsed this "time-saving way to buy time-saving tools." May we send you copies of the latest Snap-on Industrial and General Catalogs? Write—

**SNAP-ON TOOLS CORPORATION**
8020-K 28th Ave., Kenosha, Wis.

**FACTORY BRANCH WAREHOUSES IN 41 INDUSTRIAL CENTERS**

**Albany 5, N. Y.,** 546 Clinton Ave.
**Atlanta, Ga.,** 380 Techwood Drive, N.W.
**Baltimore 18, MD.,** 1209 E. 25th St.
**Boston 35, Mass.,** 116 N. Beacon St.
**Brooklyn 25, N. Y.,** 1649 Bedford Ave.
**Buffalo 13, N. Y.,** 628 W. Utica St.
**Charlotte 6, N. C.,** 915 S. Clarkson St.
**Chicago 16, Ill.,** 2023 Michigan Ave.
**Cincinnati 6, Ohio,** 705 E. McMillan St.
**Cleveland 15, Ohio,** 2912 Euclid Ave.
**Dallas 1, Texas,** 2932 Commerce St.
**Denver 3, Colo.,** 1050 Broadway
**Detroit 2, Mich.,** 93 Piquette Ave.
**Edmonton, Alberta,** 10232 103rd St.
**Fargo, N. Dak.,** 421 N. P. Ave.
**Houston 3, Texas,** 1810 LaBranch St.
**Indianapolis 2, Ind.,** 848 Fort Wayne Ave.
**Jacksonville 6, Fla.,** 1602 Walnut St.
**Kansas City 2, Mo.,** 3635 Main St.
**London, Ontario,** 111 Mt. Pleasant Ave.
**Los Angeles 14, Calif.,** 1717 W. 6th St.
**Milwaukee 3, Wis.,** 2600 W. State St.
**Minneapolis 3, Minn.,** 1218 Harmon Place
**Montreal 15, Quebec,** 751 Jean Talon St., West
**Newark 6, N. J.,** 823 Sandford Ave.
**New Orleans 13, La.,** 1040 Camp St.
**New York 56, N. Y.,** 397 East 167th St.
**Oklahoma City 3, Okla.,** 901 N. Hudson St.
**Omaha 2, Nebr.,** 109 S. 24th St.
**Philadelphia 30, Pa.,** 1710 Fairmount Ave.
**Pittsburgh 8, Pa.,** 7007 Kelly St.
**Regina, Sask.,** 2070 Albert St.
**Richmond 20, Va.,** 1617 West Broad St.
**San Francisco 2, Calif.,** 635 Golden Gate Ave.
**Seattle 22, Wash.,** 1501 Olive Way
**St. Louis 3, Mo.,** 2647 Washington Blvd.
**Syracuse 3, N. Y.,** 323 Irving Ave.
**Toledo 6, Ohio,** 2932 Monroe St.
**Toronto 17, Ont.,** 130 Laird Drive
**Vancouver, B. C.,** 1043 Davie St.
**Winnipeg, Manitoba,** 238 Garry St.

***Foremost*** **IN HAND TOOL ENGINEERING, MANUFACTURE, DISTRIBUTION**


been stepped up. The high speed ushered in by jet planes has increased the rate of ice formation during flight and work in the Lewis icing tunnel already points the way to cutting the heat required for deicing to 1/10 that used under present day techniques.

• **Automatic engine controls.** As increasing engine powers push planes faster and faster, the pilot's job is rapidly becoming one of monitoring. Replacing the manual engine control has now become a major research objective. Automatic control systems to allow safe near-limit operation of turbojets from a single control lever are virtually mandatory.

These automatic control systems, covering a wide range of flight conditions, are complex operations, and have their beginnings in a large amount of fundamental data. Lewis Lab engineers are solving the problems with tunnel studies of the engine condition to be remedied, charting an approach using the data obtained, then building the system based on this data, finally running the engine equipped with the new controls under the same conditions that initially indicated the need for automatic regulation.

Progress with this research, says NACA, indicates that the control problem will be lessened in the near future.

• **Combustion.** Studies in this field are concerned with new fuels of higher heat content and improved combustion characteristics. Low-volatility fuels also are under investigation.

The complexity of the problems involved are indicated by the periods required for the basic combustion process —mixture preparation, ignition, and flame propagation—in the different type engines. This sequence in the turbojet requires but 1/100 sec., but in the rocket engine it is slashed to 1/1,000 sec., and in the ramjet to 1/5,000 sec.

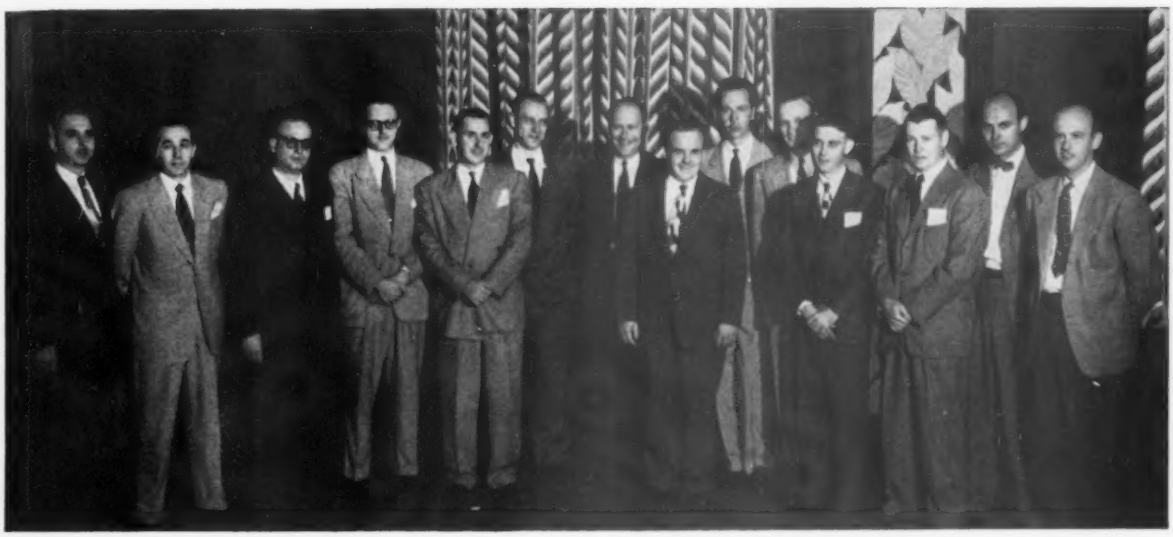
## NACA Reports

*(NACA Technical Notes are informal papers printed in limited quantities for domestic use only. They are obtainable, free of charge, only by persons having a professional interest in them. Write to Division of Research Information, NACA, 1724 F St., N. W., Washington 25, D. C.)*

▶ **Matrix Method of Determining the Longitudinal-Stability Coefficients and Frequency Response of An Aircraft from Transient Flight Data (TN 2370) —by James J. Donegan and Henry A. Pearson.**

This method was devised to apply to time-history measurements of combinations of simple quantities (such as

# Spark Plug and Ignition Symposium on an INTERNATIONAL SCALE



Representatives of the following overseas airlines, who attended the symposium, shown above, were: Air France Airlines—*Jean Aguer, J. Philippet;* Canadian Pacific Air Lines—*H. T. Bancroft;* KLM Royal Dutch Air Lines—*G. Lam, W. H. J. Wijnholds;* Pan American World Airways—Atlantic Division—*Wm. W. McClintock,* Latin American Division—*H. I. Mossbarger,* Pacific Alaskan Division—*R. K. Hart;* Pan American Grace World Airways (PANAGRA)—*S. T. Mitchiner;* SABENA Air Lines—*M. Curtiss Fillmore* (not in picture); Scandinavian Air Lines—*A. B. Holmer, L. G. Romberg;* South African Airways—*Trevor Phillips;* Trans Canadian Air Lines—*R. H. Farren, A. M. Weber.*

The seventh annual Champion Aircraft Spark Plug and Ignition Conference, held in Toledo last month, brought together over 150 technicians and maintenance men from all over the world. In addition to representatives of every major domestic airline, all branches of the air forces, engine manufacturers, oil companies and ignition parts manufacturers, representatives of nine overseas airlines were also present.

At these symposiums actual experiences with all phases of engine maintenance and operation as affected by ignition and related factors are discussed. Results of testing, "in flight" records, servicing and maintenance techniques, are put "on the record." In no other way could such a veritable gold mine of practical information be compiled. It is a tribute to the cooperative spirit of the aviation industry that it thus makes dramatic progress—through teamwork.

During the seven year period of these meetings, notable improvement has been made in total spark plug service life, and time between removals for overhaul. Flight delays due to unscheduled spark plug removals have greatly decreased. That the Champion R37S-1 spark plug has been one of the major factors in this improvement is indicated by the fact that every major domestic airline uses it, most of them standardizing on it exclusively. The same is true of the majority of overseas airlines.

**CHAMPION SPARK PLUG COMPANY, TOLEDO 1, OHIO**

**More Airlines FLY WITH CHAMPIONS Than With Any Other Spark Plug**

*when timing poses a problem, it's time to consult the A. W. HAYDON company*

Regardless of the intricacies of an application, you can depend on prompt and thorough evaluation by experienced engineers of The A. W. Haydon Company.

From problem statement through quantity production, the specialized know-how of The A. W. Haydon Company is devoted to expeditiously fulfilling your requirements.

WRITE FOR CATALOG

The A. W. HAYDON COMPANY
222 NORTH ELM STREET
WATERBURY 20, CONNECTICUT
Design and Manufacture of Electrical Timing Devices

*New! Low Cost!*
**OMNIHOMER**

OMNIHOMER

Now, a complete omni range and two way VHF in one Low Cost Unit. The new OMNIHOMER is precision built for peak performance. Installation is convenient: all controls incorporated in one simple panel, size 5¼" x 6⅞" x 10¼" and weighs only 10 lbs. installed. See your NARCO Dealer.

**DELUXE**
For those who desire the finest in omnigation, NARCO'S VTR-1 Omnigator has all the above features, PLUS ILS, marker beacon receiver, and 8-channel VHF transmission.

**narco**
NATIONAL AERONAUTICAL CORPORATION
AMBLER, PENNA.
Perfection in electronics

**SUPER SEAL SCRAPER RINGS**

meet or exceed* military specifications. For all hydraulic components, use fully approved Super-Seals . . . either AN-6231 standards, or AN-6231-A series. Definitely superior for all installations. Your inquiry *promptly* acknowledged.

** Tested at 150,000 cycles, three times govt. requirement.*

AN-6228 and AN-6229 "V" Ring Adapters

**Gadgets, inc.**
3629 N. DIXIE DRIVE, DAYTON, OHIO

angle of attack, pitching velocity, load factor, elevator angle and hinge moment) in order to obtain the overall coefficients. Although derived primarily for the evaluation of stability coefficients, simple additional computations make the matrix method applicable to the determination of frequency response characteristics. In addition the procedure can be applied or extended to other problems which can be expressed by linear differential equations.

**▶ Analysis of the Effects of Wing Interference on the Tail Contributions to the Rolling Derivatives (TN 2332)—by William H. Michael, Jr.**

In the calculation of airplane dynamic stability, small changes in the rotary stability derivatives can produce important changes in lateral oscillation characteristics under certain conditions. This is especially true in damping changes of lateral oscillation, due to changes in the yawing-moment-due-to-roll parameter.

Because of these variations in calculated results, estimation of the rotary derivatives should be as accurate as possible. This report presents a correction to the present method of estimating the tail contribution to the rolling derivatives.

The effect of wing interference on the tail contribution is determined by calculating the airstream angularity at the vertical tail in rolling flight; the resultant forces and moments can then be found. The important factors in determining the angularity distribution on the vertical tail are the wing planform, vertical-tail span, and considerations associated with angle of attack and airplane geometry.

Comparison of calculated and experimental results indicate that a consideration of wing interference can be expected to be of such importance as to change the sign of the calculated values.

Fair agreement is obtained with the available experimental data.

**▶ Automatic Control Systems Satisfying Certain General Criterions on Transient Behavior (TN 2378)—by Aaron F. Boksenbom and Richard Hood.**

This paper deals with the problem of control synthesis. Instead of solving for changes of behavior in a particular control system, this method assumes certain criteria concerning the behavior of the system and then suggests a system design.

The analysis presented develops a rational method of control synthesis evolved from arbitrary (but physically realizable) criterions and gives the equations for the best system that satisfies these criterions. The general results obtained are applied in examples to design of turbojet control systems. —DAA

# It costs no more to shop NEXT DOOR

for aircraft fasteners

## Get FASTER DELIVERY BETTER SERVICE AT NO EXTRA COST

ave time

save money

## always specify...

**SOURCE-INSPECTED BONDED STOCK**

## aircraft fasteners

These fasteners are inspected at the source, certified for government use and sealed with the Bonded Stock label. Saves time, money and confusion on your assembly line.

## Buy from your LAMSON AIRCRAFT HARDWARE DISTRIBUTOR

Airplane Manufacturers and Aircraft Parts Producers enjoy many extra advantages when they purchase AN Bolts, Nuts, Cotters and Screws from their Lamson distributor.

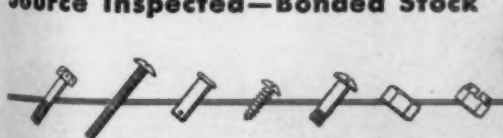
They get fast service on emergency and small quantity needs direct from stock. This helps a manufacturer keep his lines running until large mill orders come through to the distributor. Secondly, they get emergency engineering help, supplemented by service from the Lamson Engineering Department when it is required. And thirdly, fasteners *cost no more* in any quantity than they would purchased direct from the mill source. This type of pricing is peculiar to the fastener industry.

It's the distributors function to invest his money to carry stock for the aircraft manufacturers' convenience. In turn, he hopes to get your patronage on volume business. Why not help your distributor continue his special services to you? Buy *all* your aircraft fastener needs from him. Remember, it costs no more.

*Remember:*

**IT'S TRUE ECONOMY TO SPECIFY SOURCE-INSPECTED BONDED STOCK AIRCRAFT FASTENERS—AND TO BUY FROM YOUR LAMSON DISTRIBUTOR OF AIRCRAFT HARDWARE**

**Source Inspected—Bonded Stock**



Lamson + Sessions

AIRCRAFT FASTENERS

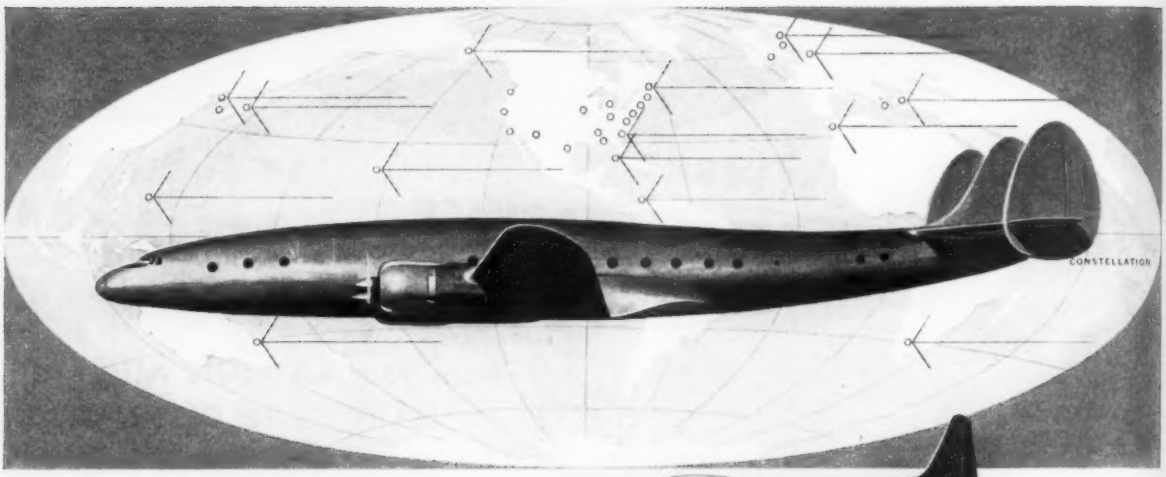
The LAMSON & SESSIONS Co. • General Offices: 1971 West 85th Street • Cleveland 2, Ohio

*Plants at Cleveland and Kent, Ohio • Birmingham • Chicago*

# *Leadership demands constant achievement*

F-80 SHOOTING STAR

P2V NEPTUNE



CONSTELLATION

F-94 JET FIGHTER

T-33 JET TRAINER

## Everywhere and all the time

*Lockheed technicians are on the job guarding the dependability of Lockheed products*

Lockheed dependability is actually "built on experience"...*operational* experience gathered the world over by Lockheed's highly trained "Field Service Representatives." Their duties are threefold:

...To give the finest on-the-spot service—both military and commercial.

...To help improve the daily performance of present Lockheed planes.

...To sift from operational experience the facts that help Lockheed build even greater aircraft.

**Fly Constellation Via:**

IN THE U. S.—Capital Airlines, Chicago & Southern Air Lines, Eastern Air Lines, Trans World Airlines.

OVERSEAS—Air France, Air India International, Ltd., AVIANCA, B.O.A.C., Israel National Airlines, Ltd., KLM, Linea Aeropostal Venezolana, Pan American World Airways, Panair do Brasil, Qantas Empire Airways, South African Airways, TWA.

# Lockheed

AIRCRAFT CORP., BURBANK, CALIF.

*Look to Lockheed for Leadership*

# Lockheed

## EXPERTS ENACT VITAL FIELD SERVICE ROLE

Its far-reaching Field Service Department is another example of Lockheed leadership in action. Over 80 highly skilled technicians maintain constant vigil throughout the world, helping guarantee dependable performance of Lockheed airplanes.

On Korea's battlefields, in the Arctic, at desert bases—everywhere—Lockheed Field Service Representatives are on hand to advise, instruct and assist the men who fly as well as those who service Lockheed aircraft.

Equally important, and even more vital to the future of aviation, is the research function of Lockheed's Field Service. Day in and day out, records are kept and reports are filed, evaluating military and commercial planes, checking performance under every operating condition . . . building up a tremendous library of flying and functional data which help in designing even greater aircraft for the future.

**Commercial service as well as military**

This same continual assistance is given the operators of Lockheed commercial airplanes—the 15 leading world airlines that daily fly Constellations over every continent and every ocean. The intelligence thus gathered is made available to all Constellation operators, further assuring Lockheed dependability.

One of many examples of valuable assistance in the field occurred recently when the British Overseas Airways Corporation suffered serious damage to its base in Filton, England. A Lockheed Field Service Representative conferred with BOAC officials, checking damage to aircraft, loss of spare parts, and destroyed facilities. Then a message to Lockheed's well-stocked U.S. warehouse speeded necessary parts to Filton immediately and restored full operation far sooner than BOAC thought possible.

This world-wide service is well worth its million-dollar annual cost . . . permits lifetime follow-through on each airplane produced . . . backs Lockheed's reputation for dependability based on experience.

# Britain's Triple-Threat Jet

**Boulton Paul P.119 can be used either as transition or equipment trainer, is convertible to fighter.**

Britain's Boulton Paul P.119 is projected to fill a triple role. It makes the most of its development as a private venture by merging a variety of accommodations into a single high-utility design.

- The plane fits the growing demand for high-performance jet-fighter transition trainers. Side-by-side seating is included, coupled with latest requirements for service training orientation.
- It provides for applied training with equipment for advanced instruction in navigation, gunnery, bombing and rocket attack.
- And also featured is quick conversion for operational use as a fighter and for policing and related functions. For these tasks it is designed to take two 20mm. cannons, and racks for bombs and rocket projectiles.

▶ **Pneumatics Used**—Ease of servicing and maintenance is emphasized. Underside of the front fuselage is fitted with easily replaceable panels, where damage would result in emergency landings with the gear retracted.

Landing gear, with a shock-absorbing capacity to take care of a vertical velocity of 14 fps., is pneumatically operated, as are flaps, dive brakes, and wheel brakes.

Pressurized cockpit is decked with a jettisonable hood, and ejection seats for instructor and pupil can be fired individually or together. Amber or blue detachable windscreen filter panels, with sliding or fixed filters covering the hood, provide for simulated instrument flight.

▶ **Can Take Nene**—Powerplant for the basic aircraft is the Rolls-Royce Derwent, located in the rear fuselage immediately aft of the rear spar attachments. Submerged side air intakes feed a plenum chamber. Fuel tanks are positioned between the ducting, this position minimizing C.G. effects as fuel is consumed.

As in other designs, the split fuselage gives quick access to the engine and with slight modification will take Rolls-Royce's Nene to boost the plane's power potential.

| DIMENSIONS | |
|---|---|
| Span | 38 ft. 9 in. |
| Length | 42 ft. 5 in. |
| Overall height | 12 ft. 3 in. |
| Wing area | 298.5 sq. ft. |
| Gross weight | 9,650 lb. |

▶ **Estimated Performance**—With the Derwent engine maximum speed is set at 475 mph. at 22,500 ft. Maximum continuous cruising speed is 430 mph. at 25,000 ft. Climb to 20,000 ft. is 7¼ min.; to 30,000 ft., 14 min. Service ceiling is set at 41,000 ft., and endurance with normal tankage is 1¾ hr. at 30,000 ft. (after allowance for taxiing, takeoff, climb, and landing). Takeoff run to clear 50 ft. is 1,485 ft., while landing distance over 50-ft. obstacle is 1,725 ft.

With the Nene, maximum speed is projected as 555 mph. at 10,000 ft.; maximum cruise, 525 mph. at about 15,000 ft. Time to 20,000 ft. is estimated at 4¼ min.; and to 30,000 ft., 8 min. Service ceiling would be raised to about 50,000 ft.

# Packaging Speeded

A new machine designed to permit faster slitting and cutting of "barrier" materials used in military packaging (guns, aircraft parts, tools, etc.) is being marketed by the Miller Wrapping & Sealing Machine Co.

This tool will cut up to 216 sheets in lengths from 3 to 26 in. It accommodates rolls 36 in. wide of Grade C, Type 1 packaging materials. It is specially suitable for handling this latter product. Special provisions are employed to prevent tacky Grade C, Type 1 from sticking to the cutoff knife.

The machine will deliver sheets into an accumulator tray (shown). Or it can be setup to deliver the cut sheets on a conveyor to coordinate sheeting and wrapping procedures.

# AIA Looks to Future Use of Titanium

**● Producers ask AMC to undertake 19 projects.**

**● And know-how for use of 'wonder metal' is one.**

By Alexander McSurely

When titanium—long heralded as the new wonder metal from which tomorrow's airplanes will probably be made—is produced in sufficient quantity to be economically usable, the U.S. aircraft industry wants to be ready with the production knowhow to handle it.

Last week, Aircraft Industries Assn.'s east and west coast manufacturing methods committees called upon Air Materiel Command for: allotment of 1952 fiscal year Air Force funds for development work on two projects for processing titanium and its alloys, for aircraft and engine parts.

The titanium projects are part of a list of 19 proposed new ways to use aircraft materials to make new high speed aircraft more efficiently.

► **New Methods**—The two projects are not large dollar-wise in the total of $2.5 million to try out new manufacturing processes. But, from the long view, they may be the most important on the list.

One, for $100,000, proposes to try out a method of drophammer forming of titanium stampings, at a working temperature of approximately 800 deg F.

**The second would spend $4,000 for each of five studies on the machining and grinding of five different titanium alloys, or a total of $20,000.**

It is proposed that Rohr Aircraft Corp., Chula Vista, Calif., which is already working on titanium forming problems, be assigned the hot-forming project. It would include: developing a means for insulating the drophammer; developing suitable furnaces for heating flat blanks and partially formed stampings; means for transferring parts from furnaces to dies, suitable die materials and lubricants, suitable arrangement for heating dies, and production of pilot runs of stampings, with metallurgical tests of materials to insure conformance with requirements.

► **End Results**—The machining and grinding projects would be designed to provide information for development and design of suitable tools, with analysis of machining variables such as speed and feed, tool material and geometry, cutting fluids and interface temperatures of tool and work. No company assignment is indicated for the machining and grinding project.

Effect of these two titanium projects and other studies of the material that are currently being made, on the future of the U.S. aircraft industry may be far-reaching. Urgency of these studies is being emphasized by aircraft industry engineering spokesmen since their findings may guide the industry in setting up to handle the new material as it comes into more general use.

Aircraft materials experts have been eyeing titanium as a nearly ideal aircraft material, from a weight-strength ratio basis, for at least the last decade.

**But although it is the fourth most plentiful mineral on the earth's surface (aluminum, iron and magnesium precede in that order) ore-reduction methods for quantity production have not been developed until quite recently.**

Estimates are that approximately 4,000 tons will be produced in 1952 as compared to approximately 500,000 tons of aluminum which is the first-quarter 1952 requirement for claimant agencies under Controlled Materials Plan.

Titanium can be substituted strength-

## Here Are Proposed Projects

Following are new manufacturing methods projects recommended by Aircraft Industries Association for Air Materiel Command sponsorship:

| | |
|---|---|
| Automatic wire measuring and cutting machine | $50,000 |
| Development of production process for hot-forming 75st extrusion and shapes by stretch | 75,000 |
| Development of hot-formed titanium stamping | 100,000 |
| Honey-comb sandwich processing and inspection | 75,000 |
| New techniques for precision forgings | 450,000 |
| Machining and grinding of titanium alloys | 20,000 |
| Development of machine for trimming parts by high-velocity jet erosion cutting: | |
| Phase I—design | 50,000 |
| Phase II—prototype construction | 150,000 |
| Development of production methods to make large-size high-quality optical glass | 200,000 |
| | $1,170,000 |

Following are additional revised projects recommended for a second time for AMC sponsorship, since no contract was let for them on first recommendation last year by AIA:

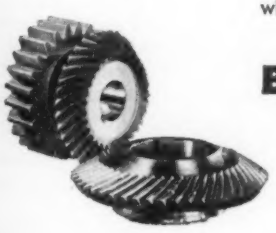
| | |
|---|---|
| Development of non-destructive weld inspection | $75,000 |
| Comparison of sheet metal forming processes | 34,500 |
| Development of stretcher leveling machine | 60,000 |
| Development of long-distance measuring machine | 100,000 |
| Development of machine for tapering and contour-forming of sheet stock simultaneously | 100,000 |
| Development of welding techniques for heavy aluminum in aircraft | 96,000 |
| Development of production method for die quenching | 125,000 |
| Development of a pre-welding metallurgical treatment | 40,000 |
| Development of a machine for stretch forming tapered sheet: | |
| Phase I—design study | 40,000 |
| Phase II—construction program | 750,000 |
| | $1,420,500 |
| **Overall total asked for 19 projects** | $2,590,500 |

*Note: The two Phase II projects proposals for $150,000 and $750,000 would be deferred to fiscal 1953 funds.*

# ENGINEERING

at BRAD FOOTE is the art and science which converts gear designs into drawings and specifications of component parts. Here . . . in our own plant . . . our own engineers determine mechanical and metallurgical structures. Our own draftsmen create the intricate, accurate drawings from which other skilled hands make the finished pieces.

- Engineering is important. It is a primary step in BRAD FOOTE's method of complete manufacturing control. It assures you of gears which will perform satisfactorily . . . when used in your shop or on equipment you sell to others.
- This engineering service we give our customers is another reason why we can say—*"No one shares our responsibility."*



## BRAD FOOTE GEAR WORKS, Inc.

**BIshop 2-1070 • OLympic 2-7700 • 1309 South Cicero Avenue**
**Cicero 50, Illinois**

AEROTEC AUTOMATIC CONTROLS

*Prove dependable* **in combat and transport operations**

An Aerotec Dual Float Switch Top Mounted

Republic, Boeing, and other leading aircraft manufacturers are using many types of Aerotec Automatic Controls in increasing numbers. These controls are custom designed and built to meet specific problems of high speed and high altitude flight in today's aircraft. Each Aerotec automatic device passes rigid tests duplicating actual flight conditions to assure its efficiency and dependability.

The planes shown above are typical designs that incorporate Aerotec Automatic Controls. The Republic F-84F Thunderjet, a combat-proven craft, uses Aerotec pressure switches and a new dual float switch suitable for tip or pylon mounted auxiliary fuel tanks. Boeing has long used Aerotec valves, float switches, and pressure switches on their famous planes.

When you are faced with problems of automatic controls for flaps, landing gear and cabin heater applications, fuel transfer, flow indication, etc., contact Aerotec. One of our instrumentation specialists is near you, ready to give prompt and able assistance at any time. Call or write.

**. . . for AEROTEC controls *custom-built to your needs* contact THERMIX**

**AIRCRAFT REPRESENTATIVES**

**CLEVELAND 29, OHIO** — Jay Engineering Co., 5413 Pearl Rd.
**NORWALK, CONN.** — John S. Hammond, Jr., 394 West Avenue
**ROSLYN HEIGHTS, L. I., N.Y.** — John S. Hammond, Jr., 25 Edwards St.
**DAYTON 3, OHIO** — Jay Engineering Co., 1517 East 3rd Street
**LOS ANGELES 43, CAL.** — Forsnas Engr. Co., 4545 West 62nd St.
**SEATTLE 2, WASH.** — Stanley R. Brett; John E. Freeman & Assoc., 1616-F 43rd North
**WICHITA 8, KANSAS** — John E. Freeman & Assoc., 4913 East Lewis Street

*Project Engineers*

**THE THERMIX CORPORATION**
*GREENWICH, CONNECTICUT*

*Canadian Affiliates:* **T. C. CHOWN, LTD.**
1440 St. Catherine St. W., Montreal 25, Quebec • 50 Abell St., Toronto 3, Ontario

**THE AEROTEC CORPORATION**
*AIRCRAFT DIVISION* — GREENWICH, CONNECTICUT

Designers and Manufacturers of Automatic Controls—*Valves:* Regulating, Relief and Check types—*Pressure Switches:* Gage, Altitude, Differential and Absolute Types—*Float Switches:* Top, bottom or side mounted—Single, Dual, or Tandem.

## Advice to AMC

The U. S. aircraft industry, as represented by its manufacturing methods committee, has some fixed policy ideas about how military service funds should be spent on production refinement contracts. Last week, with a list of 19 proposed contract projects, AIA's committee submitted these ideas to Air Materiel Command. Here are some of the basic points:

- **Manufacturing** methods funds of AMC should not be used for redesign of a product to improve its producibility, or to develop a production technique for a given design.
- **Fabrication** techniques and design of a given article for mass production are an industry function and should be an integral part of any supply contract awarded by competition.
- **Government** manufacturing methods funds should be used for developments in equipment or processes which lend themselves to general application in the industry and should not be involved in or related to proprietary designs or trade processes.
- **Air Force** should not attempt to sponsor separately projects on subjects also sponsored by RDB, ANC, and other joint agencies. Example, electronics.
- **Materials** substitution programs offer slight benefits to the services or to industry. Substitutions must be for specific designs.
- **Funds** should not be spent for improvement of processes or products in a known state of flux that may become obsolete overnight.
- **Military** services should investigate through Phase I procedure as many as possible of promising improvements in production, and consider placing limited orders for construction of machines, recognizing that it takes three years to develop a new machine and several years more to build a limited number of them.

wise for most uses of stainless steel although it weighs only 47% as much, in the same volume. And the resistance of titanium to corrosion is another high plus value. These facts together with the large quantities of the material available, are spurring the stepup of production of the metal and its alloys, along with the studies of its machineability.

► **Precision Forgings**—A project for development of forging techniques and reduction of forging tolerances, which is

# The problem was . . .

# How to get extra copies of blueprints—

# *fast!*

**A case history based on the experience of the American Brake Shoe Company, Kellogg Division, Rochester, N. Y.**

The blueprints (and direct-process prints) submitted by customers placing machining orders used to be a problem for the Kellogg Division, American Brake Shoe Company.

Invariably, prompt delivery was requested. But . . . before production could begin, extra copies of each customer-print were needed. Being semi-opaque, these prints could not be used as print-making masters in Kellogg's direct-process machine. How, then, could the extra copies be obtained in the shortest time . . . and at the lowest cost?

*Kodagraph Autopositive Paper was the answer.*

**Now . . . extra copies are made quickly . . . economically**

With Kodagraph Autopositive Paper, Kellogg reproduces the blueprints, direct-process prints, and other types of "originals" *directly* . . . quickly obtains the print-making masters that are needed so urgently.

The operation is simple . . . is performed under ordinary room light. Autopositive Paper is exposed in contact with the customer's print in Kellogg's direct-process machine. It is then processed in standard photographic solutions. The result is a sparkling, long-lasting, highly legible photographic reproduction—dense blacks, clean whites—on a durable, evenly translucent paper base. From this Autopositive intermediate, the required number of extra copies can be turned out . . . at practical, uniform machine speeds.

## Kodagraph Autopositive Paper

**"THE BIG NEW PLUS" in engineering drawing reproduction**

- **It enables you, or your blueprinter, to produce photographic intermediates directly, at a new low cost, without an extra step.**
- **It enables you to protect valuable originals from wear and tear.**
- **It gives you photo-lasting file copies.**
- **It restores old, worn drawings . . . reproduces opaques.**

**MAIL COUPON FOR FREE BOOKLET**

107

**EASTMAN KODAK COMPANY**
**Industrial Photographic Division, Rochester 4, N. Y.**

Gentlemen: Please send me a copy of your illustrated booklet giving all the facts on Kodagraph Autopositive Paper.

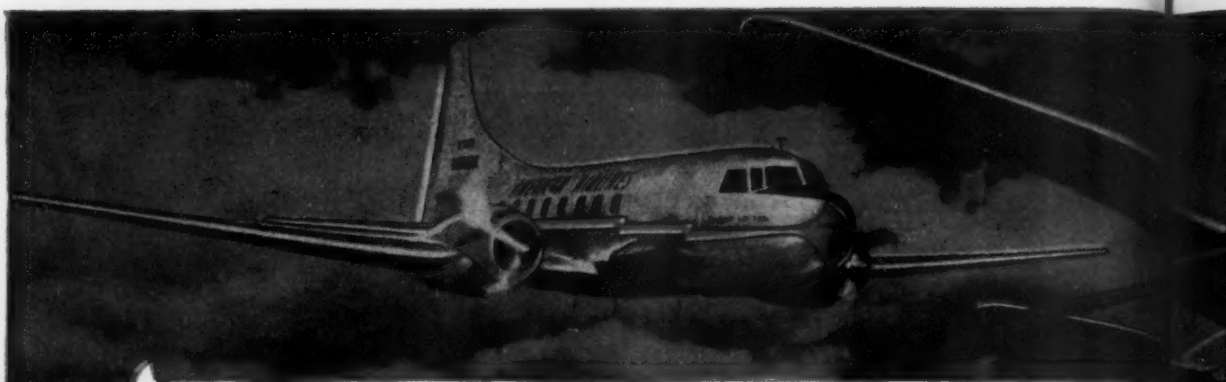
Name _____ (please print) Position _____

Company _____

Street _____

City _____ Zone _____ State _____

Kodak
TRADE-MARK



# Flagship Fleet pistons travel 789 miles ...lubricated by SINCLAIR

**In the minute it takes you to read this page, pistons in the engines of American Airlines' Flagship planes actually in use, will go a total of 789.4 miles.**

**Yes...789.4 miles up and down cylinder walls with microscopic clearances, in metal-searing heat. What an awesome wear and heat-dissipation problem! In this spot, a lubricant has *got* to be good.**

**For over 16 years, American Airlines has entrusted this job of protecting its engines from friction and heat to Sinclair Aircraft Oil *exclusively*. What better testimonial to the performance of the highly-refined aircraft engine oil!**

**Why not let Sinclair Aircraft Oil help you attain finer, more dependable engine operation?**

**SINCLAIR REFINING COMPANY**

**Aviation Sales, 600 Fifth Avenue, New York 20, N. Y.**

18 pistons / engine
2 strokes / R.P.M.
36 strokes / rev.
.5 ft. (6" piston travel)
18.0 ft. piston travel / eng. / R.P.M.

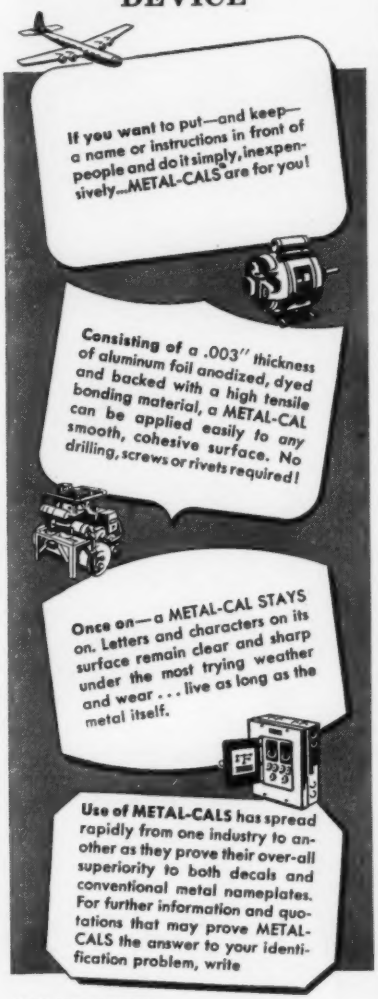
2100 R.P.M.
18 ft. / R.P.M.
37,600 ft. / eng. / min.

37,800
110.375 engines actually in use / min.
4,168,395 total fleet ft. / min.
789.4 miles / min.
5380 / 4,168,395

GET BOTH ECONOMY AND LONG LIFE WITH

Metal-Cal*

THE PERMANENT, SELF-ADHESIVE IDENTIFICATION DEVICE


If you want to put—and keep—a name or instructions in front of people and do it simply, inexpensively—METAL-CALS are for you!
Consisting of a .003" thickness of aluminum foil anodized, dyed and backed with a high tensile bonding material, a METAL-CAL can be applied easily to any smooth, cohesive surface. No drilling, screws or rivets required!
Once on—a METAL-CAL STAYS on. Letters and characters on its surface remain clear and sharp under the most trying weather and wear . . . live as long as the metal itself.
Use of METAL-CALS has spread rapidly from one industry to another as they prove their over-all superiority to both decals and conventional metal nameplates. For further information and quotations that may prove METAL-CALS the answer to your identification problem, write

*TRADE MARK REGISTERED

Metal-Cal DIVISION

C & H SUPPLY CO.

*Main Office & Plant*

Dept. G-2 Boeing Field, Seattle 8, Washington

*Sales Office* Wichita, Kas.

*Sales Office & Plant* Los Angeles, Calif.

estimated will cost $450,000 is a major item on the 19-project program proposed. It is suggested that tolerances be reduced so that a part can be forged wherever possible to the final configuration, eliminating many machining operations now required to obtain the final part.

The project calls for cost reduction through using low-cost tooling, and adequate die sinking equipment and personnel, along with quality inspection and control standards. It is proposed that the USAF forge press plant at Adrian, Mich., be considered for this project.

▶**Hydraulic Cutting**—A novel means of trimming sheet metal parts by erosion cutting under a high pressure hydraulic jet stream is proposed as a two phase project, with $50,000 allotted to theoretical evaluation and $150,000 to construction of a prototype cutting machine. Advantage of the process if successful would be in elimination of burring.

▶**Big Optical Glass**—Another major study proposed calls for expenditure of $200,000 for developing production glass, up to 36 in. in diameter and 3 to 4 in. thick for use in reconnaissance aircraft and missiles.

▶**Stretch-forming**—Biggest single project dollar-wise on the list would spend $790,000 over two years, on development and construction of a special purpose machine for stretch-forming tapered sheets. This proposed machine is described as a press which would stretch the tapered plate in a plane normal to the direction of taper.

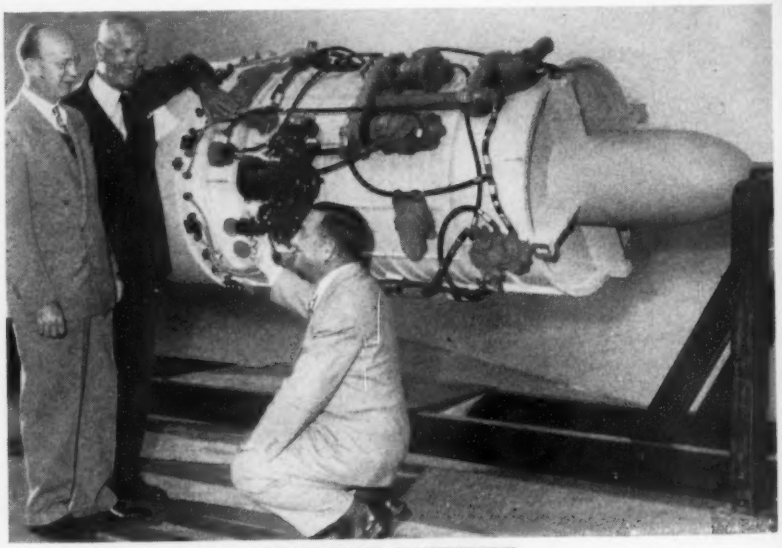
Stretching would be performed by a series of short jaws pulled by individual hydraulic cylinders. Control of the stretching would be by stops on the jaws rather than by pressure control. The machine would accommodate various types of tapered plates, would have low tooling costs, and could in some cases straighten plates that have been warped in previous operations, it was pointed out by the committee.

▶**Measuring equipment**—Need for a new means of accurately measuring distances of 10 to 100 ft. or more is cited in justification for a $100,000 project to develop equipment to make such measurements, which the aircraft industry is now finding necessary in construction of large assembly fixtures. It is suggested that optical and sonic methods of measurement be investigated and that the device would pay off in reduced tooling costs, by reducing the number of master gauges required.

## E-P Displays Parts For Subcontracting

At least a dozen urgently needed, "very good" prospective subcontractors capable of handling intricate work were spotted by Eclipse-Pioneer division of Bendix Aviation Corp., during its recent, week-long display clinic at the Eastern Air Procurement District's Newark, N. J. office.

The Teterboro, N. J. firm says it wants a lot more subs, capable of tak-



**WOODEN SAPPHIRE**

Because no actual Wright J-65 Sapphire jet engine could be made available to Buick Motor Co. for study by the licensee's engineering, tool designing and manufacturing departments, the motor car firm built this realistic-looking mockup of wood in 4,000 man-hours in 12 weeks. Studying the mockup are, left to right, Edward T. Ragsdale, Buick general manufacturing manager; Ivan L. Wiles general manager and vice president of General Motors and Verner P. Mathews, chief engineer.

# Americans Are Rolling Up Their Sleeves!

**Armed Forces Blood Donor Program**
**CALL YOUR RED CROSS TODAY**

Career girls and carpenters . . . truck drivers and teachers . . . bankers and bakers and pretty homemakers—*everybody* with a conscience is rolling up his and her sleeves to give blood.

Your Armed Forces are short 300,000 pints of desperately needed blood this month. Men, your men, on "Heartbreak Ridge" have been hit. Tomorrow it may be at some other place with a strange name. And the man who might die . . . *will* die.

*Your* Defense Department and *your* Red Cross have reminded you that blood is needed. Secretary of Defense Lovett says the situation is perilous. Our top military men in Korea say it's perilous.

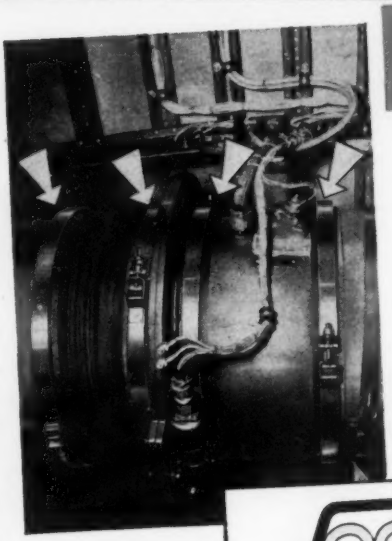
Why not join the thousands of Americans who are giving blood, giving it regularly, cheerfully! It isn't painful. Trained personnel make it easy and even pleasant.

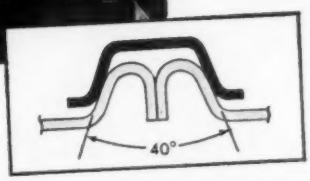
So roll up your sleeve. Make your appointment . . . today!

***What Happened to That Pint of Blood You Were Going to Give?***

ENGINEERS' NOTEBOOK

HEATING SYSTEMS






V-BAND COUPLINGS

simplify assembly and maintenance

Marman V-Band Couplings connect iris valve and expansion joints of the Douglas C-124 Globemaster II anti-icing and cabin heater. They withstand a temperature range of -65°F to 450°F with an operating pressure of 2.5 p.s.i. Marman sheet metal flanges welded to the ducts provide a quick, economical seal and the quick coupler feature of the coupling latch speeds assembly and disassembly.

Save Cost, Time and Weight with Marman

FOR INFORMATION, WRITE DEPT. W-11

10 3-410

MARMAN PRODUCTS CO. INC.
940 WEST FLORENCE AVENUE
INGLEWOOD, CALIFORNIA

STANDARD CLAMPS FOR SPECIAL APPLICATIONS


ing on a total of $225,000 a month in precision instrument and engine accessory parts, but believes the show was a good start.

Contracts with subs can be signed within two or three weeks after study of their production capabilities.

▶**Detailing Jobs**—By the end of the week over 600 visitors had seen E-P's display of 60 parts. Components were broken down to show individual parts—and each was accompanied by a tag listing the machine tools necessary to do the job. Also available were blueprints and operation analysis sheets detailing the methods the prime contractor uses to make each part shown. At least a half-dozen employes, including shop foremen, were on hand to interview prospects, explain the problem and make up a list of likely firms.

Exhibited were precision gears, rotors, shafts, cams and pins and the tool equipment needed to make them.

Visitors came from the Newark area, Long Island, Philadelphia, New York City, lower New England and upper New York State. An Eclipse-Pioneer spokesman commented that in many cases, the prime's representatives had to draw out visitors on their potentialities, which indicated lack of familiarity with the product.

Many were believed to be consumer goods manufacturers.

▶**Whole Products**—The company already has an established program for getting other firms to make complete units. Eighteen plants now fabricate entire products for E-P. Now E-P is emphasizing parts subcontracting to feed the home plant. Prior to the show it had approximately 45 subs.

## Gear Output Speeded

A new straight-line automatic loader, permitting shaving of all gears of a two, three or four-step cluster automatically by a battery of Red Ring Diagonal Shaving Machines set side by side, has been developed by National Broach & Machine Co., Detroit, Mich.

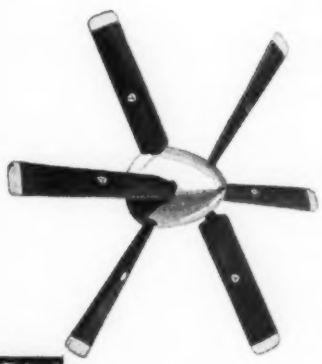
A single operator runs the setup. He simply supplies unshaved gears to the magazine feed of the first machine and picks up the completed gears from the discharge chute of the final machine. All handling between is done by automatic transfer. Cutting cycle also is automatic. While all machines are synchronized, each may be operated individually when desired. No appreciable time is lost because of differences in machine cutting time, says the firm.

An automatic gage at the feed entrance of the first machine prevents accidental inclusion of any oversize gears which might damage the cutters. Also, operation stops automatically if the discharge chute becomes completely filled.

*U. S. Navy's A2D Douglas Skyshark equipped with Aeroproducts dual-rotating propeller.*

# Aeroproducts

## *dual-rotating propeller converts power of the T40 into maximum thrust*



Aeroprops efficiently harness the tremendous power of the Allison T40 engine in the U. S. Navy's A2D Skyshark. The result? Flashing, near-sonic speed *plus* range, climb and performance possible to date *only* with this great turbo-prop power and Aeroprop combination.

Years of research went into this amazing engine and propeller combination. Yes, years of research by some of the finest aeronautical engineers in the country—the men at Aeroproducts and Allison in cooperation with the Navy, which provided our Navy with a new and vastly more destructive weapon.

As a result, Aeroproducts is now preparing to deliver on the first production order existing for Turbine propellers.

Aeroproducts engineers are available for consultation if you have any propeller requirements in the subsonic, transonic, or supersonic range. Aeroproducts—backed by the full facilities of General Motors—will be glad to serve you.

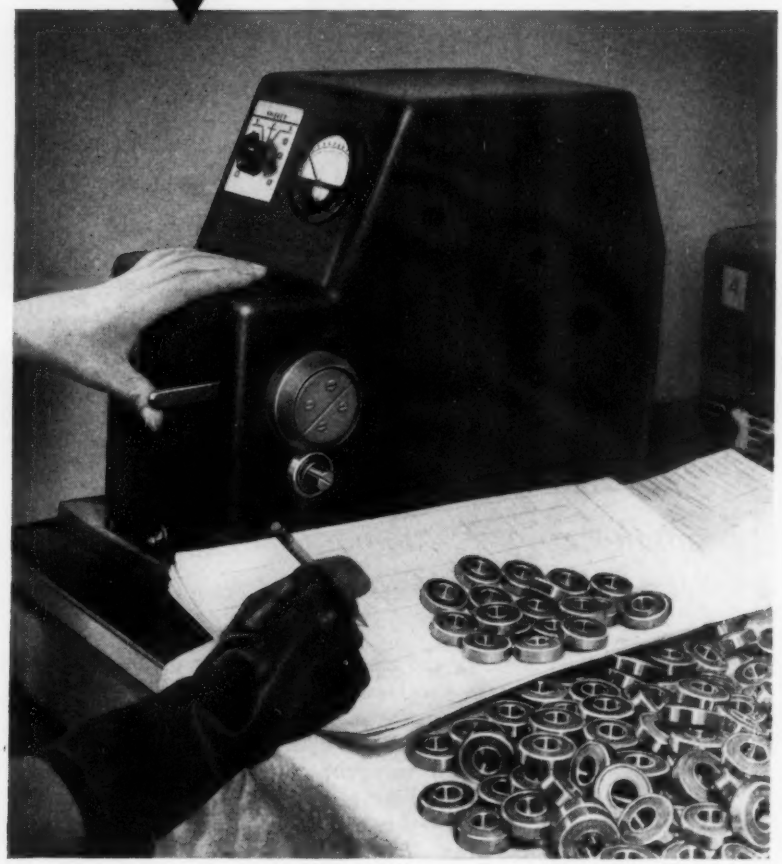
GM GENERAL MOTORS

AEROPRODUCTS DIVISION
GENERAL MOTORS CORPORATION
DAYTON, OHIO

*Building for today*
*Designing for tomorrow*

# Aeroproducts

# Clary takes bearings out for a spin



**Bearing Reprocessing Includes Electronic Spin-Testing under Rigidly Controlled Conditions—**

All steps in the reprocessing of aircraft bearings—grease-removal, spin-testing, preservation and repackaging—are carried out with Clary-developed precision instruments under tightly controlled conditions of temperature and humidity. If you have an aircraft hardware problem—manufacturing, procurement, reprocessing, testing, packaging or preservation—Clary is fully equipped with the experience and facilities to help you solve it.

Clary MULTIPLIER CORPORATION
AIRCRAFT HARDWARE DIVISION
*serving the aircraft industry since 1941*

425 E. 54TH STREET, LOS ANGELES 11, CALIFORNIA • ADams 3-6271 • Cable Address: CLARYMULT
CHESTNUT STREET, DOWNINGTOWN, PENNSYLVANIA • PHONE 1-200


## USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command.

**Aero Products div.,** General Motors Corp., Vandalia, Ohio, facilities for production of propellers controls and spare parts, over $250,000.

**Ansco div.,** General Aniline & Film, Binghamton, N. Y., photographic aerial film, Cl. 10C, over $250,000.

**Beech Aircraft Corp.,** Wichita, aluminum fuel tanks, Cl. 01L, over $250,000.

**Canadian Commercial Corp.,** Montreal, P. Q., Canada, miscellaneous spares for aircraft, Cl. 01D, over $250,000.

**Canton Drop Forging & Mfg. Co.,** Canton, O., facilities for production of propeller extrusions, over $250,000.

**Curtiss-Wright Corp.,** Caldwell, N. J., services in connection with maintenance of flight simulators, $50,000.

**Darr Aero Tech, Inc.,** Chicago, operation of Marana Air Base, Marana, Ariz., for conducting basic pilot training, over $250,000.

**Douglas Aircraft Co., Inc.,** Santa Monica, Calif., spare parts for aircraft, Cl. 01D, over $250,000.

**Douglas Aircraft Co., Inc.,** Tulsa, Okla., additional facilities for production of B-47 airplanes, over $250,000.

**Eastman Kodak Co.,** Rochester, N. Y., photographic aerial film, Cl. 10C, over $250,000.

**Educational Testing Service,** Princeton, N. J., research and reports, $49,250.

**Gallmeyer & Livingston Co.,** Grand Rapids, Mich., grinder, surface, Cl. 17A, 10 each, $107,070.

**Hotpoint, Inc.,** Chicago, turbosuperchargers, Cl. 03E, over $250,000.

**Hughes-Simonson Engineering Co.,** Dayton, maintenance of equipment under jurisdiction of WADC, 1 job, $100,000.

**Ingersoll Products div.,** Borg-Warner Corp., Chicago, jettisonable fuel tanks, 4 items, $34,353.

**Kearfott, Inc.,** Little Falls, N. J., facilities for production of N-1 compass system, over $250,000; components of Type N-1 compass system, Cl. 05A, over $250,000.

**Lockheed Aircraft Corp.,** Burbank, Calif., spare parts for aircraft, Cl. 01L, over $250,000.

**National Scientific Laboratories, Inc.,** Washington, field engineers services, $123,706.

**North American Aviation, Inc.,** Columbus, Ohio, miscellaneous spare parts for C-46 aircraft, Cl. 01C, over $250,000; miscellaneous spare parts for aircraft, Cl. 01M, over $250,000.

**North American Aviation, Inc.,** Los Angeles, aluminum fuel tanks, Cl. 03L, over $250,000.

**Oerlikon Machine Tool Works,** Zurich, Switzerland, theodolites, master stations, Cl. 17C, 9 each, 3 each, $100,000.

**Pacific Airmotive Corp.,** Burbank, overhaul of engines, over $250,000; overhaul and reconditioning of R-2800-77 engines, 150 each, $200,000.

**Piasecki Helicopter Corp.,** Morton, Pa., steel spar plywood covered twisted rotor blades, Cl. 01A, 3 each, $74,209.

**Scintilla Magneto div.,** Bendix Aviation Corp., Sidney, N. Y., miscellaneous magneto spare parts used on engines, Cl. 03H, 36 items, $138,357; miscellaneous spare parts and magnetos, over $250,000.

**Shook, Chas. H.,** Dayton, maintenance of equipment under jurisdiction of WADC, 1 job, $50,000.

**Telecomputing Corp.,** Burbank, theodolite film reader, 1 each, telecordex and data, 1 each, $29,930.

**Titeflex, Inc., Newark,** miscellaneous spare parts for aircraft ignition harness assembly, Cl. 03H, 15 items, $69,428.

# Happy Landing at Linden

*It's all here! Everything any private or corporation flyer needs in the way of perfect facilities for inbound-outbound New York City air traffic.*

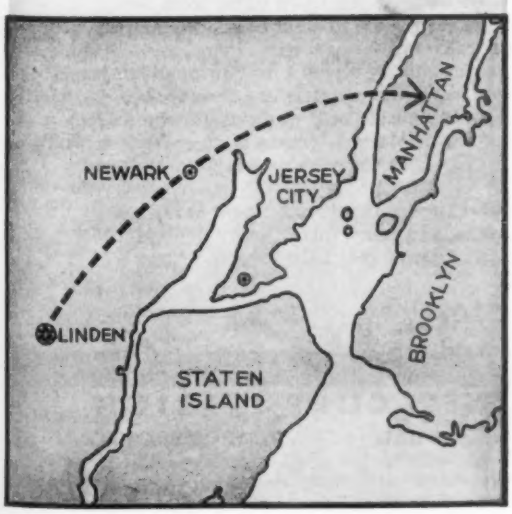
## Featured at Linden Airport

**Cities Service Aviation Gasolenes**

**Cities Service Aero Oils**

**Cities Service Cisco Solvent Engine Cleaner**

**Cities Service Aero Greases and Aviation Specialty Lubricants**




Score up Linden Airport as the finest, most conveniently located major air field under private management in the New York City metropolitan area. Linden Airport's complete modern facilities include well-paved runways and 80,000 square feet of heated hangar space.

There's never a landing fee, and you'll find it as convenient as it is economical to store your plane at Linden. Be sure to make Linden Airport your stopover point when visiting in the New York area. Three major bus lines pass the door, plus Pennsylvania rail connections direct to New York.

CITIES SERVICE

AVIATION PRODUCTS

New York Chicago

In the South: Arkansas Fuel Oil Co.

# EVERY American Jet engine flying today is equipped with PESCO Fuel Pumps

Ever since the emergency call came in 1941 for a failure-proof fuel pump that would stand up and deliver fuel to jet engines under conditions never before encountered, Pesco has paced the industry in the development of high-pressure fuel pumps.

Pesco designed and built the first fuel pump for the first American-built jet engine, and since then new models have come from Pesco engineering laboratories in rapid succession to meet the fast-changing and exacting demands of the military.

Today, every American jet engine in the air is equipped with Pesco fuel pumps. A few representative models are shown above. They range from the first simple, single element pump that produced 275 gph at 100 psi, to today's double element (main and emergency pump in a single housing) pump that delivers nearly 2000 gph at 1200 psi.

Setting the pace for jet engine fuel pump development is only one of Pesco's important contributions to safer, faster, more dependable aircraft. It is experience that can be of real help to you.

Why not call Pesco today.

engineering Pesco production

**PRODUCTS DIVISION**

**BORG-WARNER CORPORATION**

24700 NORTH MILES ROAD BEDFORD, OHIO

# LETTERS

## UHF or SHF?

I was most interested in the comments on Avionics, July 16 AVIATION WEEK, on UHF for navigation and communication in which it was stated, "Consequently a plane flying toward a ground station from a great distance will receive a signal level that rises and then fades into noise cyclically as the range decreases."

This handicap imposed on navigational aids using UHF suggests the possibility of going to SHF (a frequency region 10 times UHF) for such navigational aids as ILS, DME, and VOR. The following advantages should be gained by such a move:

- Reflections from the earth are diffused because of the greater surface roughness factor.
- Vertical radiation pattern control can effectively reduce illumination of the earth and nearby reflecting objects. This is essentially impossible at VHF because of the large radiating structures required.
- Any resulting interference from direct and reflected waves in the SHF band results in a much finer lobe structure of less amplitude which is averaged out in many cases by the motion of the aircraft.
- Although not an advantage, absorption losses are not serious in the lower part of the SHF band and the line-of-sight limitation is approximately the same for both UHF and SHF.

GEORGE B. LITCHFORD
Route 3
Huntington, N. Y.

## CAB & Safety

The CAB's Sept. 21 press release announces that the Board is to investigate the Flagler, Colo., air show accident and . . . "expressing its deep concern at the accident, the Board, in an unusual move, appointed one of its own members, Joseph P. Adams, to participate on the inquiry panel that will preside at the public hearing."

Of course all concerned should be very pleased that one of the top officials of the CAB is interested in this accident to the extent of personally participating in investigation of the factors involved.

Personally, I have noted that this degree of interest on the part of members of the Board is usually exhibited only on occasions when public indignation, as reflected by the press, is likely to result in a demand for a complete overhauling of the safety investigation set up.

You will recall that Board members sat in on the EAL-P-38 accident, the Baldwin UAL accident at LaGuardia and the Capital accident (Captain Stark) at Leesburg, Va. There may be other occasions which a little research will reveal.

This latest accident at Flagler resulted in the death of 19 persons and the pilot. Just prior to that we had the 2 accidents on UAL —at Denver and on the West Coast which resulted in a great many more deaths. However, no Board member concerned himself to the extent of sitting in on those investigations.

Safety investigation appears to be the stepchild in the CAB's house.

All too often I get the impression that the so-called investigations are conducted merely to substantiate predetermined "pilot error" findings which, incidentally, are not pursued beyond that point. Recent articles such as:

- AVIATION WEEK, Sept. 10, "New Push Given All-Weather Plans," by Lee Moore.
- Pegasus, August, "Fatigue and Air Operations."
- Jerome Lederer's speech recently delivered in England on the subject of aircraft design. . .

. . . certainly indicate a need to go beyond the Board's standard accident finding—pilot error. It occurs to me also that a member of the Board should sit in on every airline accident investigation, especially those involving deaths of passengers and crew. The economic impact of accidents on our subsidized air transportation system is justification enough for this.

May I offer a suggestion that this could be an interesting field for some of your effective editorials.

LARRY CATES,
Washington Representative
1185 National Press Bldg.
Washington 4, D. C.

## Buckaroo Speed

. . . In the caption under the Buckaroo picture on page 15 of your Oct. 15 issue, there is a typographical error which has proved rather embarrassing. You state that speed range is 52-128 mph, whereas it is 58-218 mph. I thought I would call it to your attention, in view of AVIATION WEEK's known interest in and reputation for accuracy.

SYDNEY H. CARTER
Public Relations Coordinator
Texas Engineering & Mfg. Co., Inc.
Dallas 2, Tex.

## Unfair Criticism

We wish to call to your attention an inaccurate and misleading statement which appeared in an AVIATION WEEK article entitled "Convair's Turboprop Flight Experience" on page 22 of the Apr. 23 issue.

The article referred unfavorably to "Cannon Plugs" in one part and later ignored the new vibration-resistant resilient insert "Cannon Plugs" which successfully replaced the old type on this new ship. We are aware that the fame our trade name has garnered causes users to refer to other connectors by our name.

The authors of the article had this to say in response to our query: "Please be advised that both the satisfactory and unsatisfactory connectors and vibration-resistant electric connectors were purchased and installed on the XP5Y-1 in accordance with existing AN Specifications. Since the military services purchase by military specification instead of by brand name, both the unsatisfactory and vibration-resistant connectors involved were not only the Cannon Electric Co.'s product but also include most of your company's competitors' products."

May we add that greater scrutiny should be exercised by editors where brand names are used as, in this case, but loosely.

LESLIE BAIRD, Advertising Manager
Cannon Electric Co.
3209 Humboldt St.
Los Angeles 31, Calif.

*(The article in question, headlined "Convair's Turboprop Flight Experience," was from a paper prepared for the SAE National Aeronautical Meeting Apr. 16-19 in New York. It was written by R. C. Loomis and E. D. Shannon.—ED.)*

## Enterprising Lines

We have read with interest your editorial "One More Coach Line" (AVIATION WEEK Aug. 20).

Your reference to the "most competitive airline scramble in the country—between Los Angeles and San Francisco" overlooks one important detail. While it is true that air coach traffic has expanded rapidly between Los Angeles and San Francisco metropolitan areas, the coach flight pattern originated and was developed here at Burbank.

In fairness to the various operators, we believe credit should be given to California Central and Pacific Southwest who have been operating scheduled intrastate flights between Burbank and the Bay Area (San Francisco-Oakland) for more than two years.

L. W. WULFEKUHLER
Secretary and General Manager
Lockheed Air Terminal
Burbank, Calif.

## From Electrons, Inc.

. . . We have been advised that the Sept. 24 issue of your magazine on page 122 stated Electrons Inc., Newark, N. J., had received a certificate of necessity for 75% of $4,088,390. As we have neither received nor applied for such a certificate, we request you retract or correct the statement.

JAMES H. BURNETT
Electrons, Inc.
Newark 4, N. J.

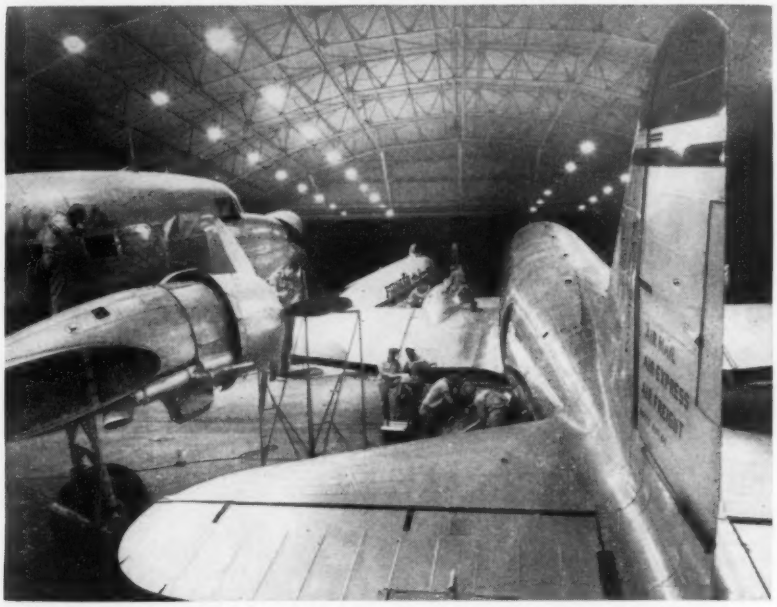
*(This error was traced to transcribing from official DPA records and AVIATION WEEK regrets the incorrect figures. Our investigation indicates that D. V. Edwards, Electrons president, applied for a certificate last Jan. 23, which was certified on Apr. 12 for $35,000 at 85 percent.—ED.)*

## For School Use

In your Sept. 17 AVIATION WEEK, I noticed pictures of the new Oerlikon Surface-to-Air Guided Missile. If, by any chance, you have spare gloss prints of these pictures suitable for reproduction, I would greatly appreciate a set. These would be used for instructional purposes here at the Antiaircraft and Guided Missile Branch of The Artillery School.

AVIATION WEEK is widely read here at Fort Bliss and enjoyed by all.

MAJ. JAMES V. STODDARD,
The Artillery School
Department of Guided Missiles
Fort Bliss, Tex.



BUSY MAINTENANCE STAFF services DC-3s in Pioneer's radiant-heated hangar.

# Ingenuity Beats Local's Problems

**Pioneer finds shorthaul, gear-up gear-down operation presents posers, but fresh approach can lick them.**

By George L. Christian

Dallas—Airline competition with railroads is usual—competition with automobiles is something different. But automobiles are serious competition to Pioneer Air Lines, the nation's oldest local service passenger carrier.

Pioneer is almost literally operating a flying bus service in an area where such service is appreciated. Pioneer's average length hop is a gear-up gear-down 77.5 mi. taking 29 min. Shortest hauls are Dallas-Forth Worth, 30 mi. and 12 min. flying time, and Waco-Temple, 33 mi. and 13 min. flying time.

▶ **Test of Endurance**—And the frequent landings and takeoffs subject its fleet of 13 DC-3s to a grueling endurance test demanding tip-top maintenance. Measure of the carrier's success is a current operating factor of 99.63 and a daily utilization of 7:52 hr.

Pioneer's type of feeder operation allows only a 16-hr. flying day instead of the 24-hr. flying day available to most trunk carriers, H. B. Siefert, vice-president of operations, told AVIATION WEEK. Reason is that most of the airline's customers do not require transportation in the middle of the night. And a utilization of 7:52 hr. out of 16 hr., extrapolated to a 24-hr. flying day gives a utilization of 11:46 hr.

Pioneer also performs such scheduling gymnastics as having a four-way connection at Abilene, Tex., in five minutes, while average ground stop time is two to three minutes.

▶ **New & Different**—Keynote of Pioneer's executive offices, operations and maintenance headquarters at Love Field is ingenuity of thought and expression. Some of the many ways this is expressed:

• **Completeness of** overhaul and maintenance facilities. These include complete casting and forging facilities—some of the largest airline maintenance bases lack the latter.

But, paradoxically, here is an airline that does not overhaul its engines (or farm them out to outside agencies). Pioneer has such a large supply of new engines, it installs a new one at every engine change. Old engines go into storage.

• **Immaculate cleanliness.** There was not one oil spot on the hangar floor when this reporter inspected the layout.

• **Employe safety.** Pioneer officials say that, to the best of their knowledge, there has not been a single accident among the employes in three years.

• **Radiant-heated hangar.** Pioneer built its own hangar provided with radiant heating. This has given draftless, even heat. Another advantage was discovered last winter when a plane, fully loaded with passengers, mail and cargo, suddenly iced up before it received clearance for takeoff. It was taxied, passengers and all, into the heated hangar. In ten minutes it was cleared of ice. It remained there until the pilot got permission to take off which he did without trouble with his warm plane.

• **Propeller storage** is simplified. Mechanics no longer bark their shins on floor-stored props. Old and worn engine propeller shafts, welded to vertical, steel hangar beams, provide ideal supports for spare props.

• **Oil cooler cleaning** speeded up. A redesigned, home-made oil cooler cleaner, capable of handling two units simultaneously, has expedited the job and relieved the oil cooler shortage. Unit continuously rotates the two coolers while squirting a steady stream of cleaning fluid through them.

• **Safe bungee cord stretcher.** If a bungee cord snaps while a mechanic is stretching it, it can break his arm. To avoid such accidents, Pioneer built a hydraulic jack on top of a ¾-in.-thick old steel water boiler, inside of which the cords are pulled to desired length, while mechanic works in safety.

• **Cylinder head-mounted propeller** governor control cable pulley assembly was developed by Pioneer. The unit weighs considerably less than the original design and has lasted 15 engine runs without failure. Asbestos washers eliminate metal-to-metal contact and resultant vibration.

• **Pilot and co-pilot** have loud speakers in the cockpit; head sets are available as standby equipment.

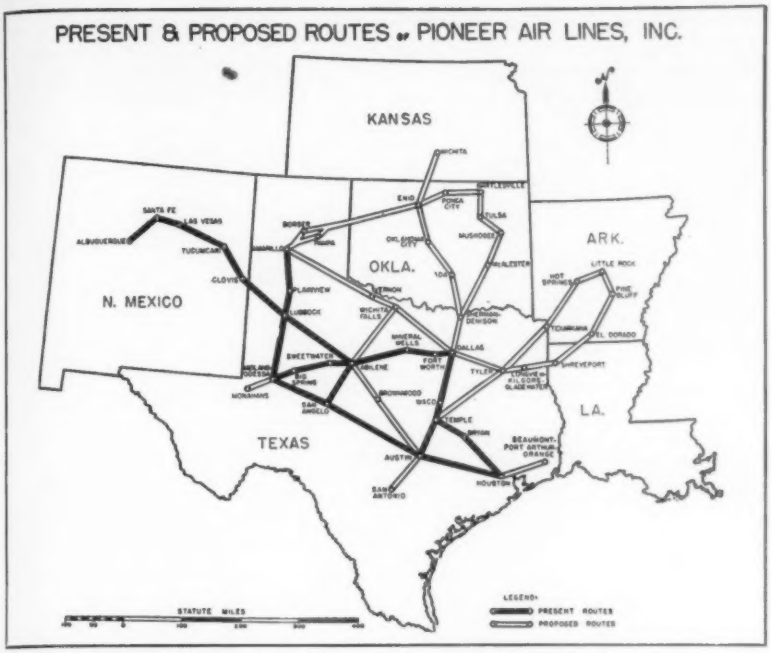
• **Exhaust tail pipe extensions** save the airline several man hours formerly expended in cleaning exhaust stains from under the wing.

• **Face-lifting interiors.** Headliner attachment points of Pioneer's DC-3s run in parallel lines fore-and-aft in the cabin giving a new and streamlined look to a usually commonplace interior.

• **On-the-job mechanic training.** Engine harnesses are built up by outlying station mechanics. R. L. Sicard, Pioneer's superintendent of engineering and maintenance, said this is a good training program for the men and reduces cost of giving the work to outside contractors or overloading the electrical shop.

• **Simple cleaning.** DC-3s sparkle when sprayed under pressure with a Pioneer-developed concoction of Bon Ami and Varsol.

And ingenuity does not stop in the maintenance shops. Hangar lean-to and executive building plans were laid




BETTER LOCAL SERVICE would be result of granting additional routes, PAL says.

out by Pioneer personnel. An architect drew the plans from these suggestions. Results are modern, functional and efficient. No windows are included since they are "only made to look out of." The executive offices are built around a secretarial pool to promote flexibility.

In the Link Trainer room, tape recordings of GCA landings are piped into the trainer to keep pilots briefed on latest blind landing techniques.

A company-subsidized cafeteria offers employes reasonably priced meals.

Pioneer has no aspirations to become a far-flung trunkline some day, its officials say. But it does want to enlarge its route structure (see map) to give better service to its area.

One big and unresolved problem wrinkling Pioneer management's brow at the moment is what kind of equipment can do the job it wants, faster and more economically.

## Non-Pressure System for Seating Windows

A simple method of installing windows on L 049 Constellations, which eliminates the inconvenience of pressurizing the cabin to seat them properly, has been adopted by Capital Airlines with the blessings of Lockheed Aircraft Corp.

It involves the use of a special vacuum plate which is applied successively to each window port on the outside of the plane to "suck" the inner (pressure) window onto its mounting, instead of pushing it into place as in cabin pressurization. The device was developed by Al Bobel, the airline's instructor of air conditioning.

▶**Evens Stresses**—Prior to Bobel's plan, Capital had to pressurize the entire cabin—as other airlines still are doing—in order to seat the windows snugly and evenly on the mounting before applying retaining screws. Lockheed issued instructions to operators to this effect about six months ago, after it became convinced a number of window failures and "blowouts" in flight were the result of uneven stresses on the inner panes caused by improper seating and application of screws. With pressurization, it believed, screws would be tightened on a window already correctly aligned in a firm seal on the mounting, thus eliminating "drawing up" and consequent strain on the window.

While pressurization evidently does the trick, it is more expensive and time-consuming than the new method, necessitating removal of the plane from the hangar and running up the engines. Capital says six men were required in the cabin to put windows in place. And speed was of the essence, because temperatures sometimes rose to an uncomfortable 120 F. in the cabin, Capital says.

The new system allows windows to be changed or inspected separately, doesn't require a large crew, permits work to be carried out in the hangar and eliminates engine run-up.


**PASTUSHIN**
**DESIGNS and MANUFACTURES**

**JETTISONABLE FUEL TANKS**

for the U. S. Air Force.

**AIRCRAFT SEATS**

for military aircraft—stressed up to 40 G's. Can be designed and built to your specifications.

**SHEET METAL and EXTRUSION PARTS**

including ribs, longerons, intercostals, and bulkheads.

•

Complete plant facilities—designing, engineering, tooling, fabrication, heat treating, and anodizing—for detail parts and complete assemblies.

**PASTUSHIN**
AVIATION CORP.
Dept. A-15
5651 West Century Blvd.
Los Angeles 45, Calif.

# For Dependable Hose Connections

**WITTEK**
STAINLESS STEEL
*Aviation*
HOSE CLAMPS

For over a quarter century, Wittek has specialized in hose clamps, devoting craftsmen's skills to producing hose clamps of uniform accuracy in clamping action combined with superior physical strength, for dependable leakproof hose connections. This experience is yours when you place your aircraft hose clamp requirements with us.

**WITTEK FBSS**
**(Radial Type)**
Made of stainless steel and utilizing the Wittek Floating Bridge. Tested and proved for dependable service on all types of aircraft applications. Long accepted as the standard of the industry.

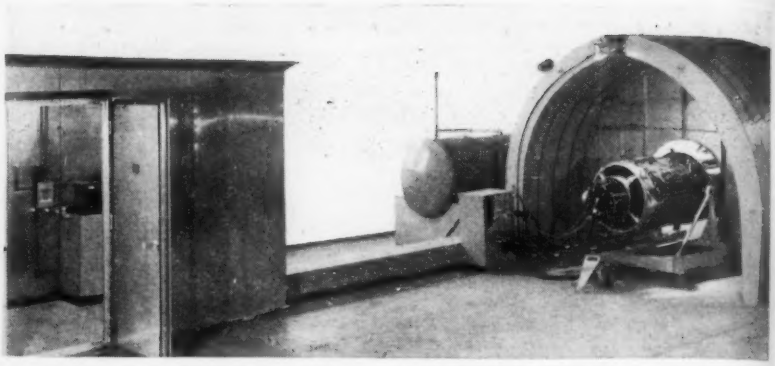
**WITTEK WWD**
**(Tangential Type)**
Made of stainless steel and available in all standard aircraft sizes. Also furnished in diameters up to 12" for duct and other special applications. Permits easy installation when hose is in place.

*Meet current AN specifications and have C.A.A. approval.*

Write for Details

**WITTEK** *Aviation* HOSE CLAMPS

**MANUFACTURING CO.**
**4308** West 24th Place, Chicago 23, Illinois

TEST house for J-33, J-35 and J-47 jet engines, designed and made by Janke is . . .

TRANSPORTABLE by air in one DC-4. Initial AF reports attribute big saving in time and money to new package test unit, shown boxed and ready for shipment.

# New Jet Tester Speeds Overhaul

**AF reports easier maintenance, lower costs in field; unit can be broken down for air-shipment in a DC-4.**

A new jet engine test cell recently put into service by the Air Force has enabled overseas bases to speed up and cut costs in trouble-shooting and overhaul testing of turbojets.

The facility can be demounted quickly and freighted by air. It reportedly permits rapid checkout in minute detail of all U. S. military turbojets and related ignition systems now in use. At advanced bases, it has ironed out a number of kinks in jet maintenance activities caused mainly by previously limited facilities.

And, according to AF, it has dropped maintenance costs impressively. One user, Neubiberg AFB, Germany, attributes savings of nearly half a million dollars to the cell in the few months it has been on the trouble-shooting and testing job there.

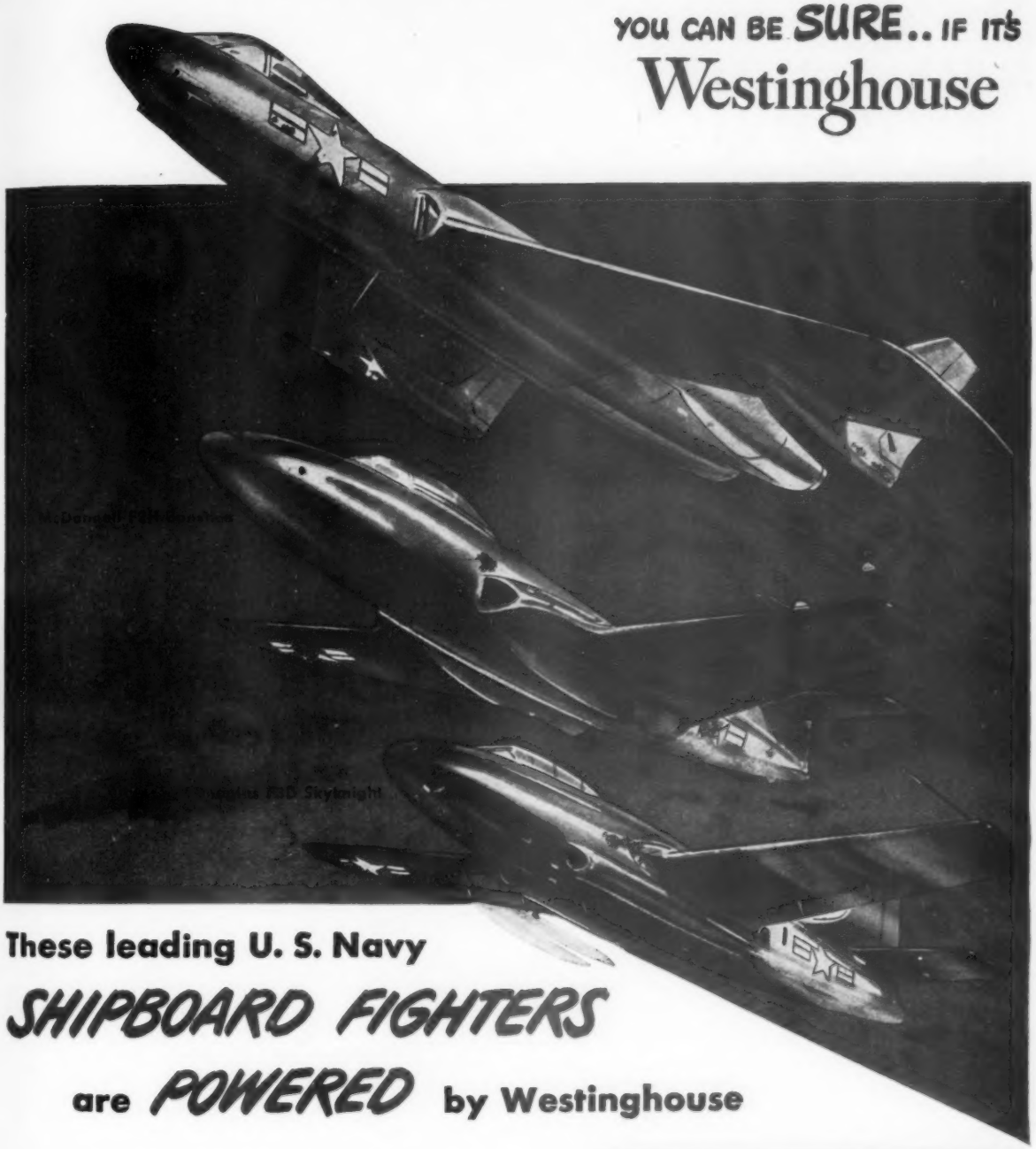
► **Airline Use**—Developed by Janke and Co., Inc., Hackensack, N. J., eight of the cells have been built for the AF and one for the Navy. Janke believes it will meet needs of the airliner when they turn to jets. Among attractive features listed by the firm: a pricetag low enough to fit airline pocketbooks; a universal ignition system test rig—one of the knottiest problems encountered in developing the cell—that can be used for checking a wide variety of jet ignition systems and starters.

The cell is in four parts—a test bed on which the engine is mounted, a terminal box to which engine lines connect, fuel supply tank and a control house. The installation is self-contained except for fluids required and an external source of electric power which connects at a central point. The complete rig can be disassembled speedily, crated and air-shipped in a plane such as the DC-4.

► **Rapid-Fire Tests**—Set up at advanced bases, the installation brings production-line efficiency to maintenance activities, cutting to a minimum the time used in removing and returning critically

YOU CAN BE **SURE**... IF IT'S

# Westinghouse



## These leading U. S. Navy

# *SHIPBOARD FIGHTERS*

## are *POWERED* by Westinghouse

**All twin engine fighters for the Navy's newest carrier-based jet squadrons are powered by the J-34. This light and slim Westinghouse engine lends itself ideally to a twin engine installation which in turn provides the reassuring safety factor of single engine operation in times of emergency.**

**The designers of these airplanes chose the J-34 because it combines high power with low weight. These features plus the power, dependability and performance of the engine assure that the air striking force of the United States Navy will be second to none.** J-54003-B

Westinghouse

**AVIATION GAS TURBINES**

# Parker
## makes all these

AN 6227 and AN 6230 Hydraulic - RINGS

5427 and 5430 High-Quality Industrial - RINGS

AF-934 Fuel Resistant - RINGS

AMS 7270 Fuel Service - RINGS

AMS 7274 Oil Service - RINGS

AN 6290 Fitting Gasket - RINGS

Special Service - RINGS

and ONLY **Parker** makes them ALL ... Every Parker O-Ring fully meets requirements of applicable specifications

...and ONLY Parker has:

- most complete mold-making facilities
- most thorough compound formulations
- most extensive research facilities
- strictest quality-control processes
- most exacting inspection and handling

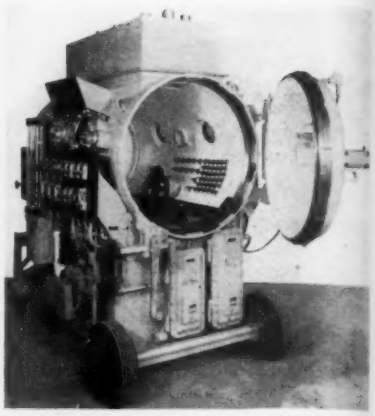
Popularly used O-Rings stocked by authorized distributors in principal cities. Special Service O-Rings of tested and approved compounds supplied on order. Write now for new Parker Catalog No. 5100 which includes complete basic data on O-Ring sealing.

THE PARKER APPLIANCE COMPANY
17325 EUCLID AVENUE, CLEVELAND 12, OHIO
Plants in Cleveland — Los Angeles — Eaton, Ohio — Berea, Ky.

**Parker**
TUBE FITTINGS
VALVES · O-RINGS

The PARKER Appliance Company,
17325 Euclid Avenue
Cleveland 12, Ohio
*Please send me my free copy of new O-Ring Catalog No. 5100.*

Name_____
Company_____
Address_____
City_____ State_____

**ALTITUDE chamber, developed by Janke and Company, tests explosion-proof qualities of aircraft components. Unit sets up highly explosive atmospheres.**

needed jet engines to service. And it probably reduces the number of spares required at a base. It can be used for rapid-order trouble-shooting of malfunctioning jets and for speedy, step-by-step checkout of every facet of operation of newly overhauled engines. Faulty parts can be removed and replacements parts checked while the powerplant remains on the test bed.

According to Neubiberg AFB, before this equipment arrived, an overhauled engine had to be put back in the plane to be tested. If this revealed faulty operation, it had to be pulled tediously out of the aircraft a second time, etc. Now, balky turbojets are confined to the cell until they learn to behave properly.

Neubiberg says it takes 15 min. for three men to pull an engine from the split fuselage of an F-84E Thunderjet and secure it on the test bed. Lines are run from every outlet of the jet to the terminal box. The engine then is run through all test phases from the sound-proofed control house. This shelter is made of aluminum alloy.

Janke says the standardized, rapid-fire techniques afforded by the cell permit an overhauled turbojet to be paced through all tests in less than an hour, compared to the 7-10 hr. required for checking out overhauled piston engines. The cell is built so it can be converted readily to test two jet engines simultaneously.

► **Special, Lowcost Cell**—Janke engineers are long on experience in designing facilities of this type, dating back to World War II when they worked under the name of Jacobsen & Co., forerunner of the present firm. Among fairly recent designs is a compact, low-cost test cell package for the fixed-base operator. This installation is relatively small and comes completely equipped to checkout small engines. It is fitted with acoustical cylinders—another Janke

# RYAN
## Answers
# RED HOT PROBLEMS

**Leading stainless steel fabricator for the aircraft and aircraft engine industries**

Consult Ryan on high-temperature metallurgy and ceramics.

**JET ENGINE COMPONENTS**

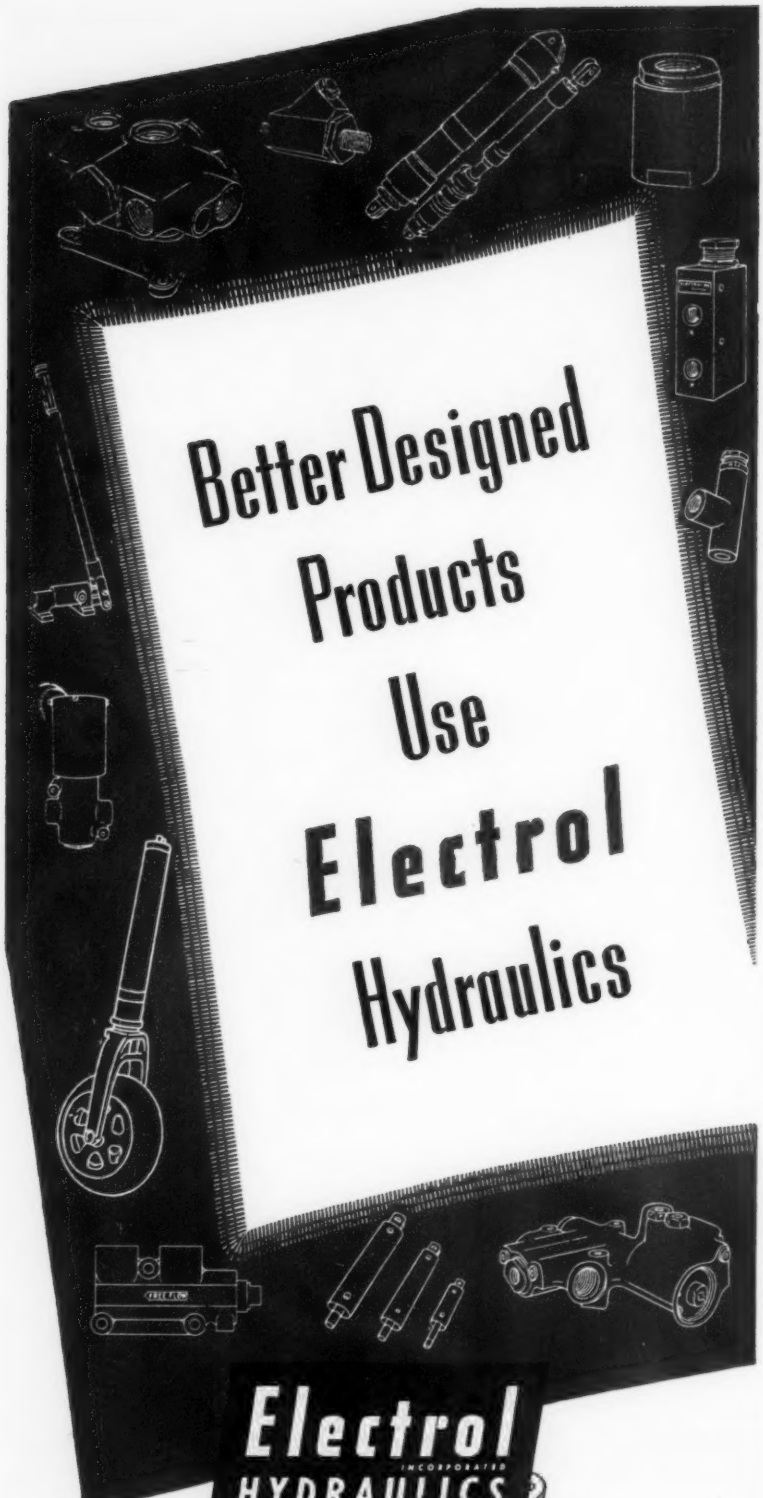
**EXHAUST SYSTEMS**

**ROCKET ASSEMBLIES**

Ryan
SINCE 1922

AIRCRAFT and AERONAUTICAL PRODUCTS

**RYAN AERONAUTICAL COMPANY**
LINDBERGH FIELD, SAN DIEGO, CALIFORNIA




specialty—on both exhaust and intake sides to deaden noise developed during the engine tests.

A late development of the firm is a heavily beefed-up altitude chamber in which highly explosive atmospheres can be injected to test explosion-proof qualities of various aircraft components. Even though the component may not trigger an explosion and seems properly designed, the operator still can double-check by sparking the chamber purposely to set off a blast—making certain an explosive atmosphere was correctly set up during the test.

Janke says the chamber can put on an impressive fireworks display. This can be observed through windows in the unit.

## Triple-Duty Unit Services Engines

New aviation service machine is designed to fill a three-fold need for aviation maintenance requirements. Greer Hydraulic OR-100 unit has these functions:

- **Clean, flush and pre-oil** jet and reciprocating engines and lubrication system components removed from storage. Machine can also do the reverse—prepare engines and components for storage.
- **Service** aircraft engine lubrication systems.
- **Pre-heat oil** to make cold weather engine starting easier.

The equipment has two self-contained systems each provided with a reservoir, pump and motor, filter and interconnected internal manifolds. Each reservoir is provided with high capacity electric heaters. The OR-100 may be equipped for trailer bed mounting; it comes mounted on wheels if desired by the purchaser.

## New Seats For Convair 340

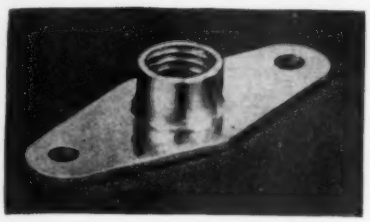
A contract covering manufacture of all the passenger seats for the new Convair-Liner 340 has been granted the Hardman Tool & Engineering Co., W. Los Angeles.

The Convair seats were designed by the aircraft company. This is said to be the largest passenger seat contract to be awarded by any airframe manufacturer in the period of the last four years.

Production on the new seats is to begin this fall and extend through the spring of 1953.

Hardman, builder to date of over 25,000 airline passenger seats, is now producing seating for Lockheed 1049 Super Constellations and Douglas DC-6Bs.

# NEW AVIATION PRODUCTS



## Tough Aircraft Nut

A tough, all-steel, self-locking anchor nut that uses no auxiliary locking devices and is designed for applications where temperatures run up to 700 F., is being produced by Kayner Mfg. Co.

Designed to meet specification AN-N-5b, the nut is lower in height and lighter in weight than any anchor nut of comparable performance, the company claims. Of simple, one-piece construction, it is fabricated from high carbon annealed spring steel in a low-cost process on high production stamping equipment. It is stamped, tapped and crimped in the annealed condition, then heat-treated, plated and finally given additional tempering.

According to the company, this "provides an extremely strong flexible threaded portion which resiliently grips the bolt . . . without necessitating auxiliary locking devices." It adds that an almost unlimited number of bolt insertions and removals can be made without diminishing the locking qualities or harming threads in the nut.

The part is available in ¼ in. solid anchor, floating anchor and gang channel types and is expected soon to be available in sizes ranging from #8 to ½ in.

The Kayner Mfg. Co., 820 E. 16th St., Los Angeles.

## New Limit Switch

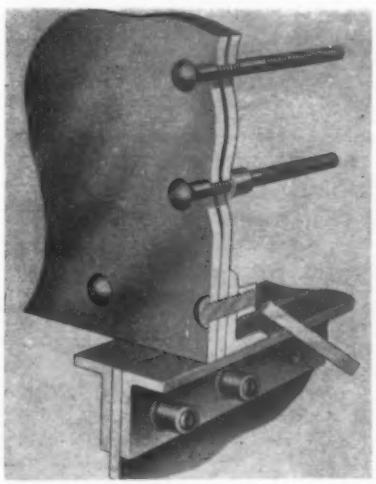
A new limit switch, designed especially to operate under adverse conditions in aircraft, has been announced by Electro-Snap.

The switch can be used for indication and control of landing gear movements, flap control, movement and interlocking of bomb bay doors, turret operation and similar applications.

The complete unit is hermetically sealed with an inert atmosphere, protecting it against freezing, corrosion, explosions, accumulation of dust on contacts, tampering and misadjustments. A tipping diaphragm action (no sliding parts) helps prevent jamming from ice formation on the outside of the unit. Performance is equal at sea level or 50,000 ft. altitude, says the maker.

The switch is a double-pole, double-throw type with nearly simultaneous breaking of contacts. SPDT models also are available. The switch is ruggedly built for long life, weighs 0.38 lb., measures 2⅝x1⅝x1⅝ in.

Electro-Snap division of Exhibit Supply Co., 4218 W. Lake St., Chicago.



## Weight, Time Saved

Aircraft "Lock Bolts," weighing 50% less than equivalent AN bolts commonly used, are now being produced.

The new two-piece fasteners, consisting of a pin and collar installed by a special pneumatic tool, are designed not only to save weight, but to speed aircraft assembly procedures. They can be installed at least twice as rapidly as conventional bolts and nuts, says the firm.

Strength of the bolts is reported to equal or exceed that of same-size AN bolts. Also, hole tolerances for an interference fit are greater, eliminating reaming, states the company. Clamping action of the new fasteners is strong enough to pull together sheets separated by a gap of ¼ in. They are made


**QUALITY-CONTROL HANDBOOK**

*Just Published*

**1.** Fundamentals and means of achieving better product quality at lower cost. Use it for basic or advanced review of all phases, not only the statistical, of the quality-control function — for quick reference to many formulas, data, record forms, etc. Covers economics of quality control; organization; acceptance, control, and assurance of quality; application to specific processes and products. Every section the work of specialists; illustrative examples from actual cases are included. **Edited by J. M. Juran, Consulting Management Engineer. 760 pages, 176 illus., $10.00**

**THE THEORY and DESIGN of GAS TURBINES and JET ENGINES**

**2.** Gives concrete examples of the application of aero-dynamic and "gas dynamic" theory to actual design problems. Discusses parameters affecting performance characteristics of turbines and investigates limitations imposed by design, materials, etc. Covers gas flow, jet-propulsion devices, fuel systems, regenerators, etc. **By E. Vincent, Univ. of Michigan, 606 pages, 283 illus., $7.50**

**PRODUCTION PLANNING AND CONTROL**

**3.** Spotlighting principles and laws that hold true for all problems, this guide tells exactly what production planning and control is and how it is installed and operated. It shows how to coordinate the whole system—how to determine the how, the where, and the cost of manufacturing or assembling a product efficiently—how to prepare the right kind and quantity of material at the right time, how to insure a sound, low-cost operation, etc. **By Thomas M. Landy, Production Control Manager, Cleveland Trencher Company. 436 pages, 128 illus., $5.50**

**INSPECTION ORGANIZATION AND METHODS**

**4.** Furnishes proved methods for increasing effectiveness, simplifying procedures, and reducing costs in inspection departments. Outlines a specific functional plan for planning, organizing, and operating these departments. Supplies the complete data necessary for orderly planning, accomplishment, and recording of inspection examination and testing, and also includes a useful general discussion of inspection job requirements and comparative evaluations. **By James E. Thompson, Consulting Management Engineer. 360 pages, 140 illus., $5.00**

**10-DAY FREE TRIAL**

**McGraw-Hill Book Co., Inc.**
**330 West 42nd St., NYC (18)**

Send me book(s) checked below for 10 days' examination on approval. In 10 days I will remit for book(s) I keep, plus few cents for delivery, and return unwanted book(s) postpaid. (We pay delivery if you remit with this coupon—same return privilege.)

- ☐ 1. Juran—**Quality-Control Handbook—$10.00**
- ☐ 2. Vincent—**Gas Turbines—$7.50**
- ☐ 3. Landy—**Production Planning—$5.50**
- ☐ 4. Thompson—**Inspection Organization—$5.00**

(Print)
Name .....
Address .....
City .....Zone.....State.....
Company .....
Position .....AW-11-12

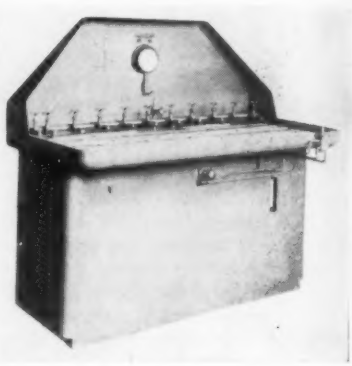
**This offer applies to U. S. only.**

FOR YOUR "AN" OR STANDARD
STAINLESS STEEL
FASTENERS . . IT'S ALLMETAL
For quality and delivery
ALLMETAL, Specialists in Stainless, Produce Stainless Products Exclusively
Allmetal Stainless Fasteners meet the rigid specifications of the Aviation Industry. All types and sizes, "AN" or STANDARD, in stock. Stainless Phillips Recessed Head Screws and Specials available too. Complete facilities under one roof assures prompt delivery.
WRITE FOR CATALOG S
ALL MADE TO "AN" SPECS
• MACHINE SCREWS
• NUTS
• BOLTS
• PINS
• RIVETS
• WASHERS
MANUFACTURERS SINCE 1929
STAINLESS STEEL FASTENERS
ALLMETAL
SCREW PRODUCTS COMPANY, INC.
33 GREENE STREET NEW YORK 13, N. Y.

TAC does what no other tool can do!
AT LAST! AN OPEN-END RATCHET WRENCH—the world's first true *universal* wrench. Widely endorsed by aircraft manufacturers and servicing organizations. This patented design is ideal for "inaccessible" connections on tubing, rods, piping, conduit, studs, etc. Smallest effective ratcheting arc yet—7½° or less. TAC speeds *all* of your wrenching jobs.
makers of advanced tools for industry
TAC
TUBING APPLIANCE CO.
7112 S. 19th Victoria • 18321 Anza Ave. • Los Angeles, Calif.

of 75ST aluminum alloy or heat-treated alloy steel and are available in a variety of head styles. Diameters range from $\frac{1}{16}$ to $\frac{3}{8}$ in. and grip length from $\frac{1}{8}$ to $1\frac{1}{8}$ in.

Cherry Rivet division, Townsend Co., 231 Winston St., Los Angeles 13.



## Plane Parts Tested

Hydraulic test stands, built to customer's requirements, for checkout of flexible hose, valves, cylinders and other components used in aircraft, are available from Superdraulic Corp.

The stands normally provide pressures up to 5,000 psi., but this can be pushed to 30,000 psi. with special booster equipment. The test rigs can be modified to include accumulator or cycling equipment, timing devices, etc., and to employ any type of hydraulic oil. They incorporate pumps, relief valves, oil reservoirs, electric motors, flexible couplings and incidential valving and piping to meet specific tests purposes.

Superdraulic Corp., 14256 Wyoming Ave., Detroit 4.

## ALSO ON THE MARKET

**Suspended CB fire extinguishers** which hang from the ceiling give automatic fire protection in storerooms and other areas in the factory, office or hangars have conventional sprinkler heads.

**Multi-purpose hose** resists oil, abrasion, permits budget-cutting standardization. It can be used for these industrial applications: air, cold water, hot water, paint spraying, oil spraying, grease and gasoline. Mercer Rubber Corp., 66 Reade St., New York.

**Small torque control** can be attached to any socket wrench, including ratchet types. It mounts between wrench and required socket, automatically disengaging when correct torque is reached. Overload Control Co., 260-63 Langston Ave., Glen Oaks, L. I., N. Y.

# LONGEST WEARING RETREADS USED ON MODERN AIRCRAFT

BOEING STRATOCRUISER

LOCKHEED CONSTELLATION

DOUGLAS DC-6

CONSOLIDATED CONVAIR

MARTIN 202

AND OTHER CURRENT AIRLINERS

**Nearly 100,000 tires retreaded by Thompson have demonstrated their unsurpassed safety, dependability and wearability. Used on the world's most modern airplanes, Thompson *Extra-Landings* Retreads have outperformed new tires in numbers of landings. They are safer than new tires because the strength of the casings has already been proved in actual service. And more Thompson retreads are used than all other reconditioned tires by air lines throughout the world.**

**A safe casing can be retreaded repeatedly. Thompson *Extra-Landings* Retreads are the product of years of specialized experience in developing safe and superior retreading for all aircraft. Each tread is built with precision workmanship and each tire is balanced perfectly.**

GET MORE LANDINGS PER TIRE DOLLAR
CONTACT THE NEAREST THOMPSON PLANT
FOR PROMPT AND EFFICIENT SERVICE

## THOMPSON *Extra-Landings* RETREADS

**THOMPSON *Aircraft Tire* CORPORATION**

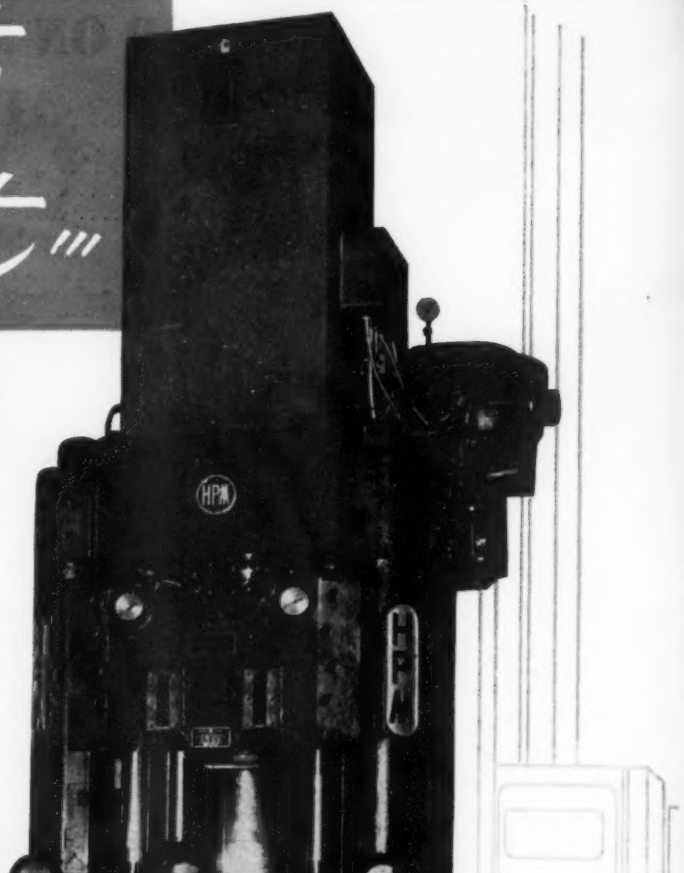
***World's Largest Retreader of Airplane Tires***

EASTERN PLANT
International Airport • Miami 48, Florida
Phone 88-1681

WESTERN PLANT
18th & Minnesota Sts. • San Francisco 7, Calif.
Mission 7-7320

# short 'n sweet"

**SPERRY GYROSCOPE COMPANY ECONOMICALLY USES 150-TON H-P-M PRESS ON SHORT RUNS FOR MORE THAN A HUNDRED DIFFERENT DRAWING JOBS!**




● Versatile and yet economical production is an accomplished fact in the pressed metal department of Sperry Gyroscope Company's Lake Success, N. Y., Plant.

With an H-P-M 150-ton FASTRAVERSE Press, Sperry handles runs of 300 pieces per set-up on 101 different jobs—jobs that vary greatly in size, depth of draw, and gauge of metal (2SO, 3SO or 52SO aluminum sheet is used).

The big factor in this production picture can be found in the exclusive operational features of the H-P-M press itself. H-P-M's FASTRAVERSE hydraulic power system provides quick and easy adjustment of press speeds, strokes and pressures to suit each individual die set-up and part to be drawn . . . cutting set-up time to a minimum . . . protecting dies . . . and assuring parts production with negligible scrap loss.

Find out about versatile H-P-M FASTRAVERSE Presses today—and how they can cut costs out of your present production methods—an H-P-M Engineer will gladly provide you with complete details.

*Write today for your free copy of Bulletin 5005 which completely describes H-P-M FASTRAVERSE and other special purpose H-P-M Presses.*

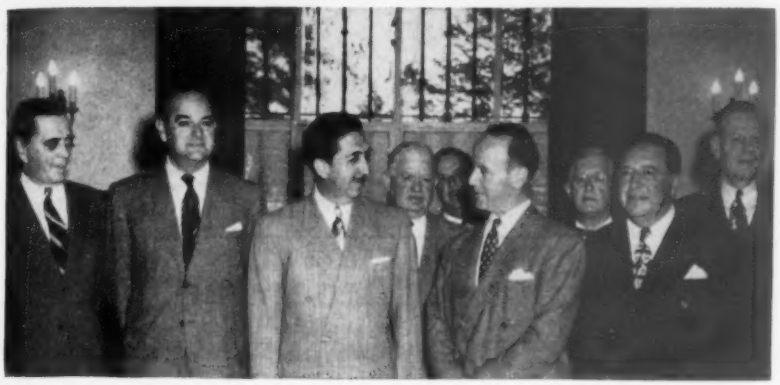
HPM

**THE HYDRAULIC PRESS MFG. CO.**

1092 MARION ROAD - MT. GILEAD, OHIO, U. S. A.

Makers of Presses for the Metal Working and Processing Industries - Plastic Molding Presses - Die Casting Machines - Hydraulic Pumps, Valves and Power Units

# AIR TRANSPORT



GREETED by Mexico's President Aleman (striped suit) are George Van Nostrand (on president's left), vice president and general manager of American Airlines de Mexico; AA president and board chairman C. R. Smith (to Aleman's right), and other board members.

## Mexico Meeting Earns Goodwill

### Officials south of border roll out plush carpets and pay high compliments to visiting AA board of directors.

By John Wilhelm
*McGraw-Hill World News*

**Mexico City**—American Airlines' publicity-wise front office pulled off a real coup recently when it flew all available members of the board of directors to Mexico City for a full-dress directors' meeting—and thereby pulled down not only front page stories but special editions in the Mexico City press. Mexico City is located at the terminal of AA's southernmost run.

C. R. Smith, president and chairman of the board of AA, knows a good publicity idea when he hears one. When his publicity expert, Rex Smith, an AA vice president, proposed the Mexico City meeting in order to draw headlines as well as goodwill from Mexican officials, the airline boss gave him an immediate green light.

▶**On Page One**—One Mexican paper ran a special 12-page edition filled with stories of American Airlines operations and history, as well as with pictures and life histories of all the members of the board. The biggest dailies in the capital front-paged the story of the "flying board meeting" and President Miguel Aleman greeted each director personally.

There also were several other interesting angles to the stunt. For one thing, it gave the directors a chance to see the Mexican leg of AA's network first hand and to see where American is going to pour over $1 million in publicity this year, aimed at stepping up the already booming Mexican tourist business.

American carried 71,327 passengers over the New York-Dallas-Mexico City run last year and this year it is doing even better. It has pulled out in front of competition and has a good chance to stay there.

▶**Works Both Ways**—American has been promoting the Mexican tourist business so well (through full page color ads in national magazines in the U. S. and through local advertising in Mexico) that this year's tourist season is breaking records with over 400,000 visitors expected by Mexico. They leave over $150 million in the till of Mexican businessmen and they buy long-haul tickets on American or its competitors if they fly. And many do fly.

The tourist business is a two-way proposition. Mexicans are susceptible to touring the U. S. and more and more are doing so each year, plus the usual Mexican businessmen flying to Washington and New York. And another important angle is the heavy college-student business, since many Mexican families prefer to send their offspring to U. S. schools.

One of American's important accomplishments in Mexico has been super-smooth relations with the Mexican government. (Very important in a country where two U. S. airlines, Eastern and Braniff, have found the door shut in their faces.)

▶**Hand from Aleman**—It is not easy for a U. S. business concern to bring its top men down and make sure they get an invitation to the Mexican White House, Los Pinos. American did it by having among the officials of their Mexican subsidiary, American Airlines de Mexico S. A., some very influential Mexican string-pullers.

Aleman shook hands with all present, and then one of the powers in Mexican politics, Lic. Alejandro Carillo, Secretary General of the Federal District, gave the AA board a formal speech at a luncheon (well covered by the local press and photographers) in which he said Mexico didn't want all types of foreign investors, but that it welcomed a company like American Airlines. That is the result of top-drawer public relations in any country.

"American Airlines is a company of gentlemen," Carillo said in a Spanish-language talk, "and is the type of company we want to have in Mexico. I personally wish to state that men like Van Nostrand (George Van Nostrand, AA Mexican head), Swift (Erby E. Swift, AA official) and Silliman Evans (on the board) are gentlemen that we receive with esteem and appreciation for their honesty, trustworthiness, and high principles, both personal and in business."

▶**No Adventurers**—"Mexico is a poor and weak nation," Carrillo went on, "and needs now to protect itself from the type of adventurer arriving here with the thought of bleeding our country. Mexico does not need or desire to receive such adventurers.

"On the other hand," he continued. "there are also investors of good faith, ready to invest their capital and to expect a just and due return from their investment. Of this type," Carillo concluded, "is American Airlines."

With such a send-off, and with the knowledge that the Mexican operation is paying off for American Airlines for the first time since it was started in 1942, the board would feel the trip well-made. Until this time, AA has been pouring in money in the belief that one day it would become an exceedingly profitable route. The day seems to have arrived.

Coupling this with the honeyed words from Mexican officials, it looks like AA has a bright future in Mexico. The 20 directors appeared to be convinced of just that as C. R. Smith carted them all off to Mexico's fabulous Pacific play-port of Acapulco for the week-end before returning them to their desks in the States.

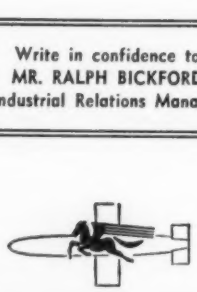
## CAB Gives New Life to Air Coach Fares

Present low-fare air coach prices will remain in effect at least until Mar. 31 of next year, the Civil Aeronautics Board has decided. These fares were to expire Dec. 31 this year.

DYNAMIC ANALYSIS

Opportunities for man qualified to head group engaged in Guided Missles guidance systems, analysis and design, Servo-Mechanism Theory, Aero Elasticity and simulator work. A prominent and responsible position for a man with applicable technical, supervisory and leadership qualifications.

Write in confidence to
MR. RALPH BICKFORD
Industrial Relations Manager



ENGINE AND AIRPLANE CORPORATION
FAIRCHILD
Guided Missiles Division
FARMINGDALE, L. I., N. Y.


## The World's Scheduled Airliners

| | TOTAL | 4-ENGINE | 2-ENGINE | 1- AND 3-ENGINE |
|---|---|---|---|---|
| World Total, 1951... | 3,830 | 990 | 2,561 | 279* |
| U. S.-Owned, 1951. | 1,218 | 500 | 668 | 19 |
| Foreign, 1951 ..... | 2,612 | 490 | 1,893 | 260 |
| World, 1950 ..... | 3,775 | 942 | 2,498 | 335 |
| World, 1949 ..... | 3,842 | 922 | 2,556 | 354 |

* Includes 46 three-engined planes (Fiats, Fords and Junkers) and 233 single-engined planes.
SOURCE: *Civil Aeronautics Board Foreign Air Division report—"Equipment of the Foreign Scheduled Common Carrier Airlines." Figures are as of July 1, 1951.*

# World Flies on American Wings

Of the 3,830 transport planes operated by 217 scheduled airlines in the world, American manufacturers built and sold 80%; Douglas Aircraft Co. alone built 56% of the world's airliners. Of the 20% not made in the U.S., Britain built 13% and Australia, Canada, France, Germany, Italy, Peru, Sweden and Russia the remaining 7%.

This is revealed in a 29-page statistical analysis of all the world's airliners, put out by the Foreign Air Division of the Civil Aeronautics Board. Title of the statistical summary is "equipment of the foreign scheduled common carrier airlines."

Part 1 of the tabular report details number, manufacturer, model and seating arrangement, and date of information for every foreign airline.

Part 2 tallies the same airlines and airliners, but lists them by model, country of manufacture, number in service, number of engines, type of plane (for example, "land biplane") and by standard seating of the model (rather than by seating as installed by the individual airline, as in part 1).

Part 3 lists planes by geographic region, nationality of airline, country of manufacture and number of engines. This section includes U. S. planes as well as foreign, for statistical comparison.

Four scheduled airlines are left out of the summary—Russia's Civil Air Fleet Administration, Hungary's Maszovlet, Argentina's LADE and Peru's TAM, two military organizations flying scheduled service.

Net gain this year in number of scheduled transports operating in the world was 55 planes or 1.5%—from 3,775 planes to 3,830.

Copies of the report are available from CAB's Publications Section.

## CAB Changes Mind On Stall Warners

Civil Aeronautics Board has reversed its earlier proposed requirements for stall warning characteristics for transport plane certification. The new CAB proposal would let officials testing the plane decide whether it gives "sufficient" pre-stall warning on the individual merits of that plane's behavior rather than on the basis of a set criterion.

Observers say the new regulation proposal would permit CAA to okay the stall warning characteristics of the Lockheed Super Constellation now up for certification—without a stall warning device. It may also enable airlines to re-certificate the Douglas DC-6B and Boeing Stratocruisers without wing spoilers. CAA and CAB officials are considering this point.

▶ **In Agreement**—All of the new CAB proposal, except the pre-stall warning clause, is about the same as the earlier proposal of two months ago. Manufacturers and airlines are expected to support the new CAB-proposed requirements generally, although they may disagree with some of its minor points.

The original proposal (AVIATION WEEK Sept. 17, p. 44) was called "arbitrary" by manufacturers because it required "clear and distinct stall warning at least 7% above stall speed."

The new CAB draft release (No. 51-12) issued by CAB Safety Regulation Director John Chamberlain would require:

**"4B.162—stall warning. Clear and distinctive stall warning shall be apparent to the pilot with sufficient margin to prevent inadvertent stalling of the airplane with flaps and landing gear in all normally used positions . . . either through the inherent aerodynamic qualities of the airplane, or by a device. . . ."**

A note explains what "sufficient" stall warning may be. It says warning 7% above stall speed is one criterion (the earlier proposed regulation required warning at least 7% above stall

speed). The note says "other margins may be acceptable depending upon the degree of clarity and distinctiveness of the warning and upon other characteristics of the airplane evidenced during the approach to the stall."

▶**No Warning Device**—Pan American, among other Stratocruiser operators, has been hoping to get permission to remove the spoilers. Only payload gain will be weight of spoiler installation.

As for stall warning, the Boeing Stratocruiser already meets the requirement of the old pre-stall warning requirement of warning "at least 5% above the stalling speed. . . ." Therefore, neither Pan American nor Boeing plans to test the Safe Flight Instrument Co.'s pre-stall warning device on a Stratocruiser, although it had earlier been reported that they had planned such an installation (AVIATION WEEK Oct. 15, p. 64).

## CAB Sets Causes In National Crash

Probable cause of the National Airlines DC-4 crash Jan. 14 at Philadelphia airport, fatal to seven, was "the captain's error in judgment in landing the aircraft too far down the slippery runway instead of executing a missed approach procedure." Civil Aeronautics Board reports. Inadequate training is also cited.

But possibly contributing factors are listed in the analysis:

• Pilot says he did not get the final tower message that told of poor-to-fair braking conditions on the snow-covered runway, although the tower's tape recorder shows the message was transmitted. CAB says "had this information been given to the flight when it first contacted Approach Control . . . additional time allowed would have permitted the captain to make a better evaluation of the field conditions. . . ."

• ILS glide path was inoperative. But CAB says this "should not have had any bearing on the approach to the runway since this facility was not needed to effect a safe landing."

• The pilot says he purposely made a slightly high approach "to avoid possible landing hazards," but "intended to land in the first third of the runway."

Wheel marks showed initial contact was made by the main landing gear 3,140 ft. down the runway with only 2,140 ft. left to go, report shows. Company DC-4 operations manual says the plane needs 2,550 ft. to stop even on a dry, 4,250 ft. on a wet or icy runway.

The Board points out that the pilot himself says he saw the ground at 500 ft. altitude over the middle marker during his instrument approach, and that as he approached the runway he could see the green threshold lights and all the runway lights. Board adds: "His decision to land at a point, which even under favorable conditions would be considered marginal to allow stopping, does not reflect (good) judgment. . . ."

CAB also thwacks the airline: "The correct decision could have been made more probable by additional training . . . although the training program complied with the minimums. . . . It is also the duty of the air carrier to provide sufficient training. . . . No rule can be promulgated which will provide for all contingencies. . . ."

**'ISLAND LIGHTS' FOR AIRPORT RAMP**

Dome reflector lights mounted on pipe standards, similar to those used on service station pump islands, provide high intensity illumination for passengers and ground personnel at Allentown-Bethlehem-Easton Airport's new administration building. All light is reflected down and does not annoy control tower personnel or confuse pilots. Lights are 14 ft. high, spaced 18 ft. apart. Floodlights shown on building roof augment lower lights, will be visored to confine light to outer ramp.


MEMO to Aircraft Manufacturers...

PACKARD is "Mr. CABLE" in your industry

Long before the building of airplanes reached the dignity of an industry, Packard was supplying cable to its experimenters and its pioneers.

As technical problems developed in the aviation field, Packard was ready with new materials, new processes and new equipment with which to assist in their successful solution.

Today, Packard is the preferred wiring in commercial and military aviation . . . Packard is "Mr. Cable" himself.

Packard

PACKARD ELECTRIC DIVISION
GENERAL MOTORS CORPORATION
WARREN, OHIO

# ENGINEERS
# DESIGNERS
# PHYSICISTS

THE Aerophysics & Atomic Energy Research Division of North American Aviation, Inc., offers unparalleled opportunities in Research, Development, Design and Test work in the fields of Long Range Guided Missiles, Automatic Flight and Fire Control Equipment and Atomic Energy. Well-qualified engineers, designers and physicists urgently needed for all phases of work in

Supersonic Aerodynamics,
Preliminary Design & Analysis,
Electronics,
Electro-Mechanical Devices,
Instrumentation,
Flight Test,
Navigation Equipment,
Controls,
Servos,
Rocket Motors,
Propulsion Systems,
Thermodynamics,
Airframe Design,
Stress & Structures.

●

Salaries Commensurate with training & experience.
Excellent working conditions.
Finest facilities and equipment.
Outstanding opportunities for advancement.

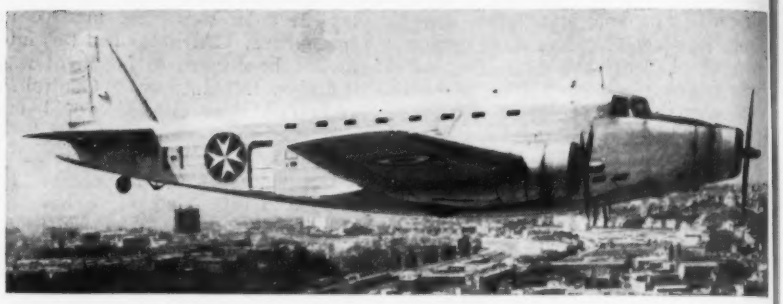
●

*Write now—Give complete resume of education, background and experience*

●

PERSONNEL DEPT.
AEROPHYSICS & ATOMIC ENERGY RESEARCH DIVISION

NORTH AMERICAN AVIATION
INC.
12214 LAKEWOOD BLVD.
DOWNEY, CALIFORNIA

MALTESE CROSS indicates ownership of this SM-82, but not nationality of its crew.

# Italy's Phantom Military Airlift

## Military Order of Malta owns the transports, but they are based on Italian fields and flown by Italian pilots.

Rome—A new type of "giveaway" program—with short, strong strings attached— is being sponsored by the Italian government to assure the availability of a military aircraft strength larger than permitted by treaty limitations imposed by the Allies.

According to treaty, the Italian air force may have no more than 150 transport and training planes out of a total of 400 of all types. But purchases from Britain and arms aid from the U.S. would raise this former figure above Italy's quota unless some still airworthy transports in the Italian airfleet were destroyed.

The thrifty Italians quickly figured out a legal loophole that would solve that problem, let them get new planes and for all intents and purposes still have the old ones.

► **Giveaway**—The "gave" the planes they would have had to destroy to the Sovereign Military Order of Malta, a centuries-old religious order without subjects or territory, whose diplomatic representatives are recognized by a number of European and South American countries.

The order now does charity and hospital work. During the war its four hospital trains were seized by the Germans when the Italians withdrew from the fighting.

The Order of Malta fruitlessly had been petitioning the Italian government to have its property restored until an Italian Air Force Staff officer, a member of the Order who was aware of the problem the Air Force was facing in the matter of destroying the transports, hit upon a novel solution: Why not meet the Order's claims by substituting the doomed transports for the trains it had lost?

► **In Name Only**—This the government accomplished by signing a convention with the Order giving it 31 SIAI-Marchetti SM-82s, 2 SM-75s and 4 Fiat G-12s, stipulating however, that the planes be stationed at military airfields and be handled by Italian military pilots and crews. Although the Order now has its white cross insignia on the planes, it must make application to the authorities before using them.

To convince any skeptics, a group of four of the aircraft were used a month ago to fly 80 Irish invalids from Dublin to Lourdes.

Since the convention was signed, the Order's airfleet now numbers nearly 100 aircraft—nearly one-quarter the size of the Italian Air Force—and soon some CANTZ-506 flying boats will be added to that number.

The Allies have been kept fully informed of the negotiations and recognize the deal as legal.

# Instrument Approach Time Is Improved

The average airline delay time on instrument approaches the first half of this year is one minute and 23 seconds —a 7 second or 8% improvement over a year ago, Civil Aeronautics Administrator C. F. Horne reported in a speech to the Los Angeles Chamber of Commerce on future plans and policies of CAA.

In this plans-and-policy talk Horne re-stated what he says has always been the CAA policy. Horne said:

"CAA has only one basic policy, which guides all our efforts, and that is to encourage and help the development of safe, useful aviation."

He cited the reduced airport delay time in instrument weather this year as an example of CAA work toward that policy. Horne noted several of the detailed contributing factors to the 28% improvement in one year:

• **Start of direct radio** communication between most CAA air route traffic control centers and the planes controlled.

- **Start of radar use** for traffic checking and control.
- **Better traffic patterns.**
- **More concise voice procedure** between air and ground operators.

## Air France Places U.S. Avionics Order

Air France has placed a fleet order of over a half million dollars for VHF navigation-communication equipment produced by Collins Radio Co.

This is by far the biggest single order placed for U. S. airborne omnirange sets (and associated VHF facilities), according to Collins.

The equipment includes 130 navigation-communication receivers (280 channels, type 51R-3), 130 glideslope receivers (20 channels, type 51V-1) and accessories.

Delivery is slated to start in May, 1952, and be completed by July.

The order does not necessarily conflict with the French Air Ministry's declared intention to adopt the British Decca System of air navigation, already partially installed in Northern France. Air France points out its ocean transports eventually must have VOR equipment to approach airports in this country anyway and it believes there will be enough of these same facilities in France, built by the U. S., to bring planes into that country.

The visual omnirange system was tentatively endorsed recently as the international standard for air navigation by the International Civil Aviation Organization—without entirely shutting the door on the Decca System. In effect, the dispute between advocates of both systems is still very much alive, to be taken up in forthcoming meetings, but the majority of the world's airlines, including Air France, have supported the VOR system. Britain, specifically British European Airways, has been the leader of the forces in opposition to the idea.

## Air Coach Idea Grows in Australia

*(McGraw-Hill World News)*

Melbourne—Qantas Empire Airways is considering joining Ansett Airlines in offering Australian air coach service. Qantas' action probably depends on the outcome of an Atlantic flight trial next year.

And it is understood that some other Australian airlines are considering the introduction of something similar as a precaution against the decrease in passenger traffic which may be caused by further increased fares. The second-class air travel would mean more passengers per aircraft, less specialized serv-


Slick airways

SUPPLY & SERVICE DIVISION

maintenance
overhaul
modification
spare parts
service

Whether your aircraft requires a major overhaul or minor maintenance, you can be sure of top service and first-class workmanship when Slick's Supply & Service Division does the job.

The same extensive Maintenance and Overhaul facilities which service Slick's fleet of Airfreighters and many of the world's leading executive and passenger transports are available to you.

Fully equipped CAA-approved aircraft, engine, instrument, radio, and sheet metal shops, together with a large stock of spare parts*, insure finer, faster servicing by Slick's experienced A and E mechanics.

*Immediate delivery on C-46 parts.

*For the Finest Aircraft Servicing*

SUPPLY & SERVICE DIVISION

Slick airways inc.

3000 N. Clybourn, Burbank, California



CPI

HIGH TEMPERATURE SWITCH

for
- DE-ICING SYSTEMS
- HEAT EXCHANGERS
- HEATERS
- STRUCTURE OVERHEAT INDICATION

Low Thermal mass gives fast thermal response. Withstands extreme under or overshoots of temperature. Used on America's outstanding military aircraft for thousands of hours of actual flight time. Precision made to the most critical instrument standards. Approved by AMC. Write for full details. Inquiries on special problems of thermal control are invited.

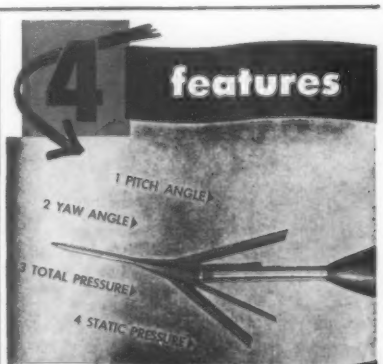
CONTROL PRODUCTS · INC

306 SUSSEX STREET • HARRISON, N. J.

DESIGNERS AND MANUFACTURERS OF THERMAL DEVICES



4 features




WITH THE aerohead pick-up

Aerohead Pickup is suitable for subsonic and supersonic speed measurements. It faces the airstream ideally sampling total and static pressures transmitted through the swivelhead with less than 1% error. Measures pitch and yaw angle with 0.2° accuracy to range of ±20°.

Has small size, high natural frequency and potentiometric angle output 0 to 5 volts DC. Also available without pitot static tube.

*For details on this and other instruments write:* G. M. GIANNINI & CO., INC. PASADENA 1, CALIFORNIA

giannini

Piasecki

"The Fastest Growing Co. In The Industry"

NEEDS
Engineering
DRAFTMEN
With Aircraft
Experience On

—Airframes, Controls, Electrical Installation & Power Plant Installation.

Also ENGINEERS For

Flight Test . . Instrumentation . . Structural Test . . Materials and Process

Scheduled 45 hour, 5 day week, Premium Pay for Overtime, "The Most Liberal Pension Plan in The Aircraft Industry", Group Hospitalization, Group Insurance, Paid Vacations & Holidays.

Clean, Modern, Well Lighted Building in Park Like Surroundings, Half Hour by Car or Train from Center of Philadelphia. Railroad Depot at Plant Entrance.

This Is An Opportunity to Work in One of The Most Rapidly Expanding Companies in America, With an Acknowledged Need for Its Products in The Defense of Our Country, but With an Equal Demand for The Untapped Commercial Market When the Defense Job is Complete. Such a Future Presents Real Opportunity for Advancement.

WRITE

Giving Detailed Resume of Experience and Education to—

Engineering Personnel Manager

PIASECKI
HELICOPTER CORP.
Morton, Pa.

A Philadelphia Suburb
NEAR SWARTHMORE

ice such as hostesses, stewards, etc., and somewhat more austere refreshments and menus served during flights.

Ansett has been operating such a service for some time on its intercapital flights in Australia. Ansett recently cut fares on long flights by 25%, on short flights by 12½%. This was done on the eve of a general 15% fare increase inaugurated on Australia's internal routes.

Part of Ansett's ability to undercut its competitors' fares is ascribed to the fact that the carrier also operates a system of ground transportation and hotels, whose profits may help offset losses incurred in cut-rate air carriage.

## SHORTLINES

► **Airlines Clearing House** of ATA reports a 37½% gain to $205,971,776 in interline traffic business the first nine months of this year over a year ago. September billings were up 34% to $24,373,950; third quarter was up 40% to $73,438,346.

► **Air Transport Assn.** members testing flight altitude recorders don't care much for them. CAB accident investigators promoted their development and use, but airline attitude is that once a plane hits something, the altitude can be determined anyway. . . . ATA will use net profit of the airlines after taxes in reports to Congress and press releases from now on; previously, ATA's small economic staff has stuck to net operating income. Taxes now take an average 47-50% bite out of net operating income. Rule of thumb now: If you must show operating income, always show final net profit with it.

► **American Airlines** Flight 321 encountered gunfire and minor damage somewhere between Boston and Providence recently. On approaching Providence, pilot found his hydraulic pressure gone. After landing he found that one slug had made a 1½-inch cut in the fuselage and severed a hydraulic line. There was also a nick in the propeller. Deer hunter or prankster is suspected.

► **British Overseas Airways** has bought control of Gulf Aviation, Ltd., operating out of Bahrain in the oil-rich Persian Gulf.

► **Civil Aeronautics Board** has amended its rules of practice to rule out petitions for reconsiderations of final Board decisions in economic proceedings unless basically fresh grounds not earlier considered are introduced.

► **KLM Royal Dutch Airways** says by

Rusco Seat Belts Put Safety First...

Consider these 6 outstanding Features of Tog-L-Lok Seat Belts

1. *Instant, position action* . . . to lock or unlock simply throw lever.
2. *Dependability* . . . Positive Toggle Grip—Meets C.A.A. Tests.
3. *Simplicity* . . . Instantaneous adjustment and release.
4. *Lightness* . . . 50" belt assembly weighs less than a pound.
5. *Foolproof plastic tip* . . . nothing to pull off, nothing to fray.
6. *Shock resistance* . . . no treacherous slipping.

This Rusco Belt is considered "Standard" for light planes. Other Rusco belts for every requirement. See your aircraft supply house or our nearest office.

RUSCO AERO PRODUCTS

THE RUSSELL MANUFACTURING CO.
MIDDLETOWN, CONN.
New York • Chicago • Detroit • San Francisco

important in packaging!

STRETCH...

Specify
NYLCO
Strength-Stretch
Barrier Materials

Write today for Free swatch and specification book #412

np NYLCO PRODUCTS INC.
530 Main St., Clinton, Mass.

Represented nationally by leading packaging engineers.

adding jet exhaust stacks to its Constellation 749A engines, it has cut required trans-Atlantic fueling stops at Gander from 54 to 40% of eastbound runs.

▶**Las Vegas Airport** has been restricted from serving airlines by CAA, due to base failure of the runways. This hits Continental and Pioneer, who have had to suspend service temporarily. Pioneer says there has been no announcement on when repairs will be made.

▶**Los Angeles Airways'** first 8-10 passenger Sikorsky S-55 helicopter is about ready for delivery. It will be the first truly passenger-type copter in U. S. scheduled passenger service.

▶**Mid-Continent Airlines** is trying to step up on-time performance by attaching a sticker to the ticket of each passenger announcing flights will close out 10 minutes before plane time.

▶**New York Airways** is worried about CAB's protracted delay in deciding who gets the potentially lush New York metropolitan area copter service certificate. CAB examiner recommended NYA for it. Reportedly, the Board then voted 4-0 in favor of NYA, too, but final decision was deferred due to shifts in Board membership; then a depleted and changed membership reportedly voted to give the certificate to Metropolitan Air Commuting. Chief NYA worry: CAB examiner cited NYA's superior finances a chief recommendation overmac; now MAC has had a chance to raise more equity, which could influence CAB even though the record of the case is supposed to be closed as of oral argument last Jan. 9.

▶**Pan American World Airways** is speculating as to who got syndicated columnist Joseph Alsop started in his attacks the last two week's against PanAm alleged Washington lobby.

▶**Philippine Air Lines** has placed an order for three Convair-Liner 340s.

▶**Trans-Pacific Airlines** recently certificated Hawaiian territory airline competing with Hawaiian Airlines, is trying to decide what type of new aircraft to buy. Operations Vice President William H. Randall has made two visits to the U. S. studying latest techniques of domestic airlines. Several days of his first visit were spent at Glenn L. Martin and Douglas Aircraft.

▶**Trans World Airlines** and Mid-Continent Airlines has asked CAB to approve one-stop through service between Twin Cities-Los Angeles via interchange at Kansas City.


No. 9022
AF Approved
AN-P-20b

AN No. 3350-2

AN No. 3370-2

No. 237-EAU
AF Approved

No. 637SS
Solder Terminal
AF Dwg 5086187
AN 3307-1

No. 637 ANS
AN-Connector
AF Dwg 5086186
AN 3306-1

No. 9031
AN-Connector
AF Dwg 5086185
AN 3308-1

Leach
AIRCRAFT RELAYS

WHATEVER THE PLANE—
...OR PURPOSE

LEACH RELAY COMPANY provides the nation's leading aircraft manufacturers with a wide selection of AN, AF and NAF approved relays. New designs and modifications are being constantly developed, tested and produced to satisfy rigid Government specifications. Highest standards of engineering, materials, maximum safety, minimum maintenance and long life performance are built into each LEACH unit. More *modern aircraft*, military, commercial and civilian, are equipped with LEACH relays than any other kind.

*FOR BETTER CONTROLS THROUGH BETTER RELAYS—CONTACT LEACH*

LEACH RELAY CO.

5915 AVALON BLVD., LOS ANGELES 3, CALIF.
*Representatives in Principal Cities of U. S. and Canada*

1/3 HIGHER RATE OF CLIMB *Sells Planes!*

KOPPERS

Make your plane *stand out* with AEROMATIC® ... world's only *automatic* variable pitch propeller for personal planes! Saves fuel, adds safety, makes a plane *get up and go! Find out for yourself*, write for story to KOPPERS CO., INC., AEROMATIC PROPELLER DEPT., 267 Scott St., Baltimore, Maryland.

*The propeller with a brain for personal planes*

Aero matic

*(Licensed under patents of Everel Propeller Corp.)*

Your Best Choice
FUEL SYSTEM COMPONENTS

FOR EXPERIENCED
DESIGN and PRODUCTION

ALLEN AIRCRAFT PRODUCTS, INC.
PRECISION ENGINEERS TO
THE AVIATION INDUSTRY

ALLEN offers complete facilities for the designing, tooling, machining, electro-film graphiting, assembling and testing of custom engineered fuel system components. Give us your special requirements or specifications. Write or wire for full information.

DROP TANK
VALVE AND
10056 Port

ALLEN AIRCRAFT PRODUCTS, INC.
P. O. Box 29, Phone 7533, Ravenna, Ohio
Coast Rep. THE THORSON CO. 1644 N. Orange Grove Ave. Los Angeles 46, Calif. HE3007

**SEARCHLIGHT SECTION**
*Classified Advertising*
EMPLOYMENT — BUSINESS EQUIPMENT — USED OR RESALE
**OPPORTUNITIES**

# MECHANICAL STRESS ANALYSTS

**Unusual opportunities for important analytical work on HELICOPTER transmission systems**

**ALSO**

**many openings for qualified**

***Mechanical & Structural***

## DESIGNERS
## DRAFTSMEN
## CHECKERS
## LOFTSMEN

*Send detailed resume to*

Personnel Manager
KAMAN AIRCRAFT CORP.
WINDSOR LOCKS, CONN.

## BELL AIRCRAFT CORPORATION

**Pioneer Helicopter Manufacturer**

*Offers*

**Immediate Opportunity for Qualified Aircraft Personnel as:**

- **CHIEF OF LABORATORIES**
- **MATERIALS AND PROCESS LABORATORY SUPERVISOR**
- **METALLURGIST**

**Long range helicopter development and production program offers excellent opportunity for outstanding and experienced men.**

**Submit complete resume to:**

***Manager, Engineering Personnel***

## BELL AIRCRAFT CORPORATION

***Helicopter Division***

**P. O. Box 1, Buffalo 5, N. Y.**

***All replies will be held in strict confidence.***

## AIRPORT LIGHTING

*Complete Installations*
RUNWAY-TAXI-OBSTRUCTION
CONES - CABLE - LENSES
FLOODLIGHTS - ADAPTERS
CAA APPROVED
*Immediate Delivery From Stock*
**AVIATION EQUIPMENT CO.**
NORTH PHILADELPHIA AIRPORT
Phila. 36, Pa. OR 3-1177
Also Complete Inventory of Cannon Plugs—Send for List

## AIRFRAME ASSEMBLY
## ALUMINUM HOUSINGS
## ELECTRONIC CHASSIS

**Whether you require quantity production or one precision unit, our experienced sheet metal aircraft men and aeronautical engineers are prepared to produce them for you to Army-Navy specifications on a rigid schedule.**

**DURATECH MFG. CORP.**
198 MAIN ST. TARRYTOWN, N. Y.

## TURBOPROPS

**276 pages 5½ x 8½, photolith, illustrated, cloth bound—$5.00**

*"A WELL-THOUGHT-OUT Book"*
*By Professor Volney C. Finch* AERONAUTICS
*Stanford University* (London)
At Your Bookstore or Order From
THE NATIONAL PRESS, Millbrae, California

## WANTED

**WANTED**
**BALL AND ROLLER BEARINGS**
SMALL OR LARGE LOTS
New and Unused
Phone Republic 2-9153
RUART SALES COMPANY
4617 W. Adams Blvd., Los Angeles 16, Calif.

## WANTED - AIRCRAFT PARTS

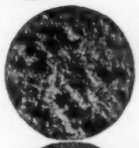
*Will buy AN hardware, fittings, AN electrical connectors, switches, etc. Send complete details at once.*
*AIRCRAFT DIVISION:*
**MANUEL T. FINE & CO.**
7001 Santa Monica Blvd. Los Angeles 38, Calif.

## WANTED—RADIO SURPLUS

**T-47A/ART-13, ARC-1, ARC-3, APR-4, TS-34 URGENTLY NEEDED!**
**Telephone WAlnut 1662 for quick action. If you can supply any of the above. We also buy: APR-1, APR-5A, BC-348, BC-221, All "TS-" Equipment, Microwave Items, Laboratory Equipment, Manuals, Tubes, Parts, Wire & Cable, etc.**
**ENGINEERING ASSOCIATES**
434 Patterson Road Dayton 9, Ohio

# WHERE TO BUY

## SWITCH



FROM CASTINGS LIKE THIS

TO NON-GRAN CENTRIFUGAL CASTINGS

• Eliminate Porosity! Improve Physical Properties! Request booklet. American Non-Gran Bronze Co., Berwyn, Pa.

PRECISION MACHINE WORK — NON-GRAN — CASTINGS • SAND & CENTRIFUGAL

*REPLIES (Box No.): Address to office nearest you*
*NEW YORK: 330 W. 42nd St. (18)*
*CHICAGO: 520 N. Michigan Ave. (11)*
*SAN FRANCISCO: 68 Post St. (4)*

### POSITION VACANT

REGIONAL SALES Engineer, Northeast U. S. and Canada, airborne automatic control systems and devices, electronics predominant. Experience essential. Only complete resume and requirements considered. P-2400, Aviation Week.

### POSITIONS WANTED

ATR PILOT, 11 yrs. experience, 5600 hrs., 5100 Multi-Engine, last 5½ yrs. Whelan Drug Twin Beech. Excellent Reference. John Dunham, 446 Hasbrook Blvd., Ordell, N. J.

PUBLIC AND Customers Relations man, young, 12 years experience military, commercial aviation desires more challenging position with future and opportunity of travel. Commercial pilot, 4,500 hrs. PW-2404, Aviation Week.

PILOT, AIRLINE and Executive Flying. Experience ATR with all ratings: 8,300 hours all types. On foreign assignment as pilot and engineer in charge of Aviation operations for major oil company. Desires position with future in U. S. January first. Age 30. Married. Transport ratings held in four countries. Best references. PW-2408, Aviation Week.

### FOR SALE

**Beechcraft D-18S**

Fully equipped with deicers, anti-icers, ARC-VHF radio, 80 gallon nose tank, 3 chairs and one 3-place couch. Engines R-985 AN-14B, having 230 and 400 hours S.O.H. Spare zero time S.O.H. AN-14B engines included. Excellent condition, ready immediate operation. Asking price, $42,500. Call or write William C. Wold Associates, 516 Fifth Ave., New York 18, N. Y.

### WANTED

**Wanted: Plane**

for elementary training. Characteristics: Biplace, monoplane. Engine: 200 H.P., approximately. Maximum speed: 250 Km/h, Minimum speed: 60-80 Km/h. To be used all kinds of acrobatics, and night flying. Offers should be mailed not later than December 20, 1951, to: Aero-Club of Syria, Damascus, Syria B.P. No. 390.

**Wanted: Bell Helicopters B or D's**

and spares; list hours; manufacture date; spares available. W-2410, Aviation Week.

**CURTISS-WRIGHT CORPORATION**

**PROPELLER DIVISION**

*. . . offers Long-Term Career Opportunities for Experienced*

# DESIGN ENGINEERS

*and Recent*

# ENGINEERING GRADUATES

Aeronautical, mechanical, electrical and metallurgical engineers combine their efforts to form the teams responsible for the creative engineering necessary to produce Curtiss-Wright's electric and turbolectric propellers.

Academic training of the junior engineer combined with the technical knowledge and experience of the senior engineer are merged to form a well balanced engineering organization.

The forgings, castings, cams, gears, hydraulic and electrical mechanisms comprising a propeller provide a diversity of problems so that the engineer finds ample opportunity to continue the development of his skill.

Activities in engineering cover:

1. **NEW SOLUTIONS TO DESIGN PROBLEMS.** *Creative Design and Development of Mechanisms that are a Departure from Current Designs.*

2. **DEVELOPMENTS IN EXISTING DESIGNS.** *Modifications in Current Designs to meet Changing Service Requirements and Increase the Life of the Product.*

3. **THEORETICAL ANALYSES.** *Advanced studies in the field of Aerodynamics and Experimental Stress Analysis as Applied to Propellers being proposed for Advance Models of Aircraft.*

**PLANT LOCATION**—Northern New Jersey, 25 miles west of N. Y. C.—on State Highway 6. Employees live in pleasant residential towns within a radius of ten miles from plant. Nearby colleges offer graduate night courses for employees wishing to continue academic work.

Send a resume to J. W. Long, Administrative Engineer, AW-12, Propeller Division, Curtiss-Wright Corporation, Caldwell, N. J.

# ENGINEERS

GOODYEAR AIRCRAFT

**Goodyear Aircraft Corporation, one of the oldest aircraft development organizations in the field, now offers unusual opportunities to engineers, both experienced and recent graduates, in all branches of aircraft design and development.**

**In addition to manufacturing airplanes and airships, Goodyear Aircraft builds a number of vital aircraft components as well as guided missiles, radar and other material for the defense program. The diversification of products, beyond purely defense needs, at Goodyear Aircraft, has resulted in an unusually stable and progressive organization throughout post war years.**

**Salaried positions with accompanying liberal employee benefits and bonus for extended work week are open to**

**AERONAUTICAL**
**MECHANICAL**
**CIVIL**

**ELECTRICAL**
**ELECTRONICS**
**INDUSTRIAL**

**ENGINEERS**

**for**

**DESIGN AND DEVELOPMENT**

**of**

**AIR FRAME STRUCTURE**

**LANDING GEAR AND HYDRAULICS**

**EQUIPMENT AND POWER PLANT INSTALLATIONS**

**ELECTRONIC AND ELECTRICAL SYSTEMS**

**WHEELS and BRAKES**

**MECHANICAL COMPONENTS**

***Personnel are needed in the following classifications:***

**DESIGNERS**
**PHYSICISTS**
**DEVELOPMENT ENGINEERS**

**DRAFTSMEN**
**MATHEMATICIANS**
**TOOL ENGINEERS**

**STRESS AND WEIGHT ANALYSTS**

**Previous experience and formal education desirable. However, applicants without formal education but with equivalent practical experience in other engineering fields will be given consideration.**

**You are invited to investigate these opportunities by submitting a resume of your qualifications and experience or by simply sending for an application either of which will be given prompt and serious consideration.**

Address all correspondence to
Mr. C. G. Jones, Salary Personnel Department

# GOODYEAR AIRCRAFT CORPORATION

AKRON 15, OHIO

AKRON 15, OHIO

# GENERAL MOTORS

NEEDS QUALIFIED MEN
IN THE

## JET AIRCRAFT PROGRAM

### Standards Engineers

Experience in Engineering Standards, Process & Gov't. Specifications.

### Stress Engineers

Must Have Minimum of 3 Years' Aircraft Experience.

### Metallurgical Engineer

Thorough Knowledge of Aircraft Structural Materials. Also Forging and Casting Design. Aircraft Experience Essential.

### Machine Designer

Qualified to Design Metal Cutting Machinery. Heads & Attachments and Re-design Standard Machines for Special Purposes.

### Loftsmen

Must Have Aircraft Experience.

*Send Full Details of Experience & Personal Data to:*

**B. M. BUCKLEY**

**BUICK-OLDSMOBILE-PONTIAC ASSEMBLY DIVISION**

**GENERAL MOTORS CORPORATION**

**KANSAS CITY, KANSAS**

## MARQUARDT AIRCRAFT CO.

Is engaged in the development of subsonic and supersonic ramjet engines and related control and accessory equipment. Our production line is turning out ramjet engines under government contracts.

**IMMEDIATE OPENINGS ARE AVAILABLE FOR EXPERIENCED**

- Aircraft Structures Design Engineers
- Fuel Controls Design and Development Engineers
- Test Facility Design Engineers
- Combustion Development Engineers
- Instrumentation Engineers

*APPLY:*

**PERSONNEL DEPARTMENT**

**7801 Hayvenhurst Ave. Van Nuys, Calif.**

## AC SPARK PLUG DIVISION

*of*

## GENERAL MOTORS CORPORATION

**PRECISION INSTRUMENT PLANT**

Positions now available for highest caliber personnel in the field of airborne automatic, electro-mechanical control equipment.

**MECHANICAL DESIGN ENGINEERS**
**ELECTRONIC ENGINEERS**
**SERVO ENGINEERS**
**JUNIOR ENGINEERS**

New and expanding division of an established firm with 20 years of successful experience in the instrument field. Work involved deals with the manufacture and development of highly complex equipment of the most advanced type.

*Write or Apply*

**AC Spark Plug Division**

**GENERAL MOTORS CORPORATION**

**1925 E. Kenilworth Place**
**Milwaukee 2, Wisconsin**

**Outstanding Opportunities Now Available at**

## BELL AIRCRAFT CORPORATION

**Pioneer Helicopter Manufacturer**

*For:*

- Instrumentation Engineers
- Flight Test Analysts
- Mechanical Test Laboratory Engineers
- Weights Engineers
- Power Plant Engineers
- Transmission Designers
- Stress Analysts

Interesting and challenging work in a long range helicopter development and production program. Personnel with aircraft experience desired.

Submit complete resume to:

*Manager, Engineering Personnel*

**BELL AIRCRAFT CORPORATION**

*Helicopter Division*

**P. O. Box 1, Buffalo 5, N. Y.**

*All replies will be held in strict confidence*

Rockets

Missiles

Flying Boats

Advanced Military Aircraft

Commercial Airplanes

Guidance Systems

**VARIETY** SPICES THE LIFE OF **ENGINEERS** WORKING WITH **Martin**

***Needed Now!***

**Cabin Conditioning Engineers**

Three years' experience required.

**Power Plant Engineers**

Three years' experience—jet engine analysis, design and test background.

Martin has the greatest diversity of projects of any aircraft company in the East. Offers greater opportunities for development, career positions for qualified engineers. Submit strictly confidential resume outlining qualifications in detail. Personal interviews arranged.

**THE GLENN L. MARTIN CO.**
**Personnel Dept. • Baltimore 3, Md.**

## ENGINEERING DESIGN SUPERVISOR

Group leader or higher to assume responsibility for military airframe design in small expanding company. Excellent opportunity to advance. Ability to carry work to completion is required.

## LAYOUT ENGINEERS STRESS ANALYSTS

Must have several years experience in airplane design, and must be able to supervise small groups.

**ANDERSON, GREENWOOD & CO.**
**Municipal Airport Houston 17, Texas**

## FLIGHT TEST ENGINEERS

Excellent opportunities immediately available for qualified Flight Test Analysts and Flight Test Engineers.

*Write Employment Manager*

**FAIRCHILD AIRCRAFT**
**HAGERSTOWN, MARYLAND**

# McDONNELL AIRCRAFT CORPORATION
## has openings for the following positions:

PROJECT AERODYNAMICIST — HELICOPTER. Six years of aerodynamics experience required, including a minimum of three years in helicopter aerodynamics for work on long range development of high performance transports, liaison helicopters, cargo unloaders, and convertiplanes.

SENIOR AERODYNAMICISTS—HELICOPTER. Four years of aerodynamics experience required, including a minimum of two years in helicopter aerodynamics, for work on long range development of high performance transports, liaison helicopters, cargo unloaders, and convertiplanes.

AERODYNAMICISTS—AIRPLANE. Two years of aerodynamics experience required in either subsonic, transonic or supersonic aerodynamics for work on high performance military airplanes.

STRUCTURES ENGINEERS—AIRPLANE. Two years or more of experience required in either stress analysis, air loads, or physical testing for work on high performance military airplanes.

FLUTTER AND VIBRATION SPECIALISTS—MISSILES. Two years or more of experience in the techniques of conventional flutter and vibrations analsyis and interested in investigations concerned with the interaction between aeroelastic effects and guidance and control equipment for missiles.

DYNAMICISTS—MISSILES. Openings are available for young men interested in the analytical work and REAC work associated with the analysis and synthesis of complex loop control systems, with airframe dynamics, flutter and vibration and with stability analysis of power control actuators. Requirements for job are an engineering or physics degree, a desire to do theoretical and analytical work, and an above-average proficiency in mathematics and mechanics.

DESIGN ENGINEERS—AIRPLANE AND MISSILES. Two to five years of aircraft or missile design experience in airframe structure, equipment installations, component mechanisms, or power plant installations.

Those persons possessing the qualifications listed above and who are interested in associating with a young progressive company are invited to contact the *Technical Placement Supervisor,*

McDONNELL

*Aircraft Corporation*

ST. LOUIS 3, MO.

---

**LOCKHEED VENTURA**

Priced for Executive Conversion. Dual Controls. 250 hours airframe time. R-2800-31 engines—13 hours since major.

Complete C.A.A. Approved Engineering for EXECUTIVE CONVERSION

**AiResearch Aviation Service Company**
Los Angeles International Airport

---

**New Airplane Hangar For Sale**

100 x 128 Ft., NEVER ERECTED, 9 Trusses, wood bow string truss ring bolted joints 100 Ft x 13½ ft., on 16 foot centers, complete with sides 17½ feet high, windows not glazed, Roofing, Sides, all Bonderized Steel, no ends furnished, takes lowest insurance rates, construction and Erection Blue Prints furnished, $37,500.00 F. O. B.

Houseman, Wayland, Mich., Phone 3507

---

**LOCKHEED 12A**

A fine executive airplane, beautifully finished and completely overhauled. Equipped with reclining chairs, lounge and latest VHF and Omni. Immediate delivery. Must Sacrifice. $25,000.00.

**AERO WAYS, INC.**
Cleveland Airport Cleveland, Ohio

---

2—DOUGLAS C-47A CARGO 24 Volt—92 ENGINES
1—EXECUTIVE INTERIOR LODESTAR
Zero time throughout since overhaul and modification.

*for details:*

**STONNELL & HOLLADAY**
National Airport Washington, D. C.
*Phone STerling 5753*

---

**BEECHCRAFT D18S**

Late Model—corporation owned—de-icers—anti-icers—ARC Omni ARC-3 VHF transceiver, etc.—condition excellent.

**PAGE AIRWAYS, INC.**
Rochester Airport Rochester, N. Y.

---

**INSTRUMENTS**

All types, Flight and Engine. CAA certified, or Army-Navy source inspected and certified. Fully guaranteed. Send us your requirements for prices. Complete overhaul and repair facilities.

**AMC Supply** P. O. BOX 1440 FORT WORTH, TEXAS

---

**C-46**

PARTS COMPONENTS
PACKING KITS

*We Manufacture Parts*

**CHARLES E. MATHEWS & CIA. INC.**
P. O. Box 223
Int'l Airport Branch
Miami, Fla.

## Wanted
## ENGINEERS
AND
## SCIENTISTS

**Unusual opportunities for outstanding and experienced men.**

These top positions involve preliminary and production design in advanced military aircraft and special weapons, including guided missiles.

**Immediate positions include:**

Electronic project engineers
Electronic instrumentation engineers
Radar engineers
Flight test engineers
Stress engineers
Aero- and thermodynamists
Servo-mechanists
Power plant installation designers
Structural designers
Electro-mechanical designers
Electrical installation designers

Excellent location in Southern California. Generous allowance for travel expenses.

Write today for complete information on these essential, long-term positions. Please include resume of your experience and training. Address inquiry to Director of Engineering.

**NORTHROP AIRCRAFT, INC.**
1003 E. Broadway
Hawthorne (Los Angeles County) California

## DESIGN ENGINEERS
**WANTED**
**GAS TURBINE and Afterburner Research**
**Established 1927**

SOLAR

**Wanted at Once:** DESIGN ENGINEER A and DESIGN ENGINEER B. Excellent opportunities for advancement in Gas Turbine Work. Must be capable of working from design specifications in making layouts of complete parts or components including sheet metal construction, taking into consideration manufacturing costs, weight, stress, heat, material properties, mechanics, dynamics, and production problems.

Work for a good, strong Company where Research is respected. Recent Solar developments in After-burners and small Gas Turbines of wide application now provide new openings for engineers capable of quality work and willing to locate in sunny San Diego . . . housing available.

Write, in confidence—

DIRECTOR, INDUSTRIAL RELATIONS
**SOLAR AIRCRAFT COMPANY**
Main Plant and Head Office
San Diego 12, California

## AIRCRAFT & ELECTRONIC EQUIPMENT

**As a leading supplier we offer a complete line of**
**BRAND NEW INSTRUMENTS**

- FLIGHT & NAVIGATION INSTRUMENTS
- ENGINE INSTRUMENTS
- AUTOMATIC PILOTS
- INVERTERS
- AUTOSYNS
- PRECISION AUTOSYNS
- RATE GENERATORS
- SYNCHROS
- ALNICO FIELD MOTORS
- GYROS
- A.C. MOTORS
- D.C. MOTORS
- SERVO MOTORS
- TORQUE UNITS
- TORQUE AMPLIFIERS
- FREQUENCY METERS
- BLOWER ASSEMBLIES

***Write for complete listings***

*All Instruments May Be Purchased C.A.A. Certified*
*U. S. Export License-2140*

**WUX Great Neck, N. Y.**
## INSTRUMENT ASSOCIATES
**363 Great Neck Rd., Great Neck, N.Y.**
***Tele: Great Neck 4-1147***

FOR SALE
**AIRPLANE HANGAR DOORS for quick disposal**
20 doors—steel and glass on rollers each 10' wide and 20' high.
**John J. Abramsen Co., Inc.**
200 W. 72 St. *En-2-7417* N. Y. C.

## CHIEF PROJECT ENGINEER
And
## CHIEF TEST ENGINEER

To work with a small select group of Engineers on aircraft pumps and accessories.

**CHIEF PROJECT ENGINEER** to be in complete charge of Engineering Department and supervise basic designs of aircraft, fuel, vacuum, hydraulic and air pumps. Capable of advancing to Assistant Chief Engineer.

**CHIEF TEST ENGINEER** to be in complete charge of Experimental Test Laboratory, supervise testing, write test reports, etc.

Prior experience in the aircraft pump field essential. Must be Engineering graduate. Must have had supervisory experience. Submit personal history including education, work experience, and references to our Chief Engineer. Write in confidence.

**LEAR, INCORPORATED**
Romec Division, Elyria, Ohio Phone 2271

## ENGINEERING SPECIALISTS

**OPPORTUNITY TO BECOME ASSOCIATED WITH THE DESIGN OF THE WORLD'S LARGEST SUPERSONIC TEST FACILITIES.**

**Transfers To Operational Phase Available At Later Date.**

**IMMEDIATE POSITIONS AVAILABLE FOR AERONAUTICAL ENGINEERS OR PHYSICISTS WITH SOME BACKGROUND IN TRANSONICS, SUPERSONICS, OR HYPERSONICS.**

**Positions Also Available For Mechanical, Electrical, Structural, And Instrumentation Engineers.**

## SVERDRUP & PARCEL, INC.
*Consulting Engineers*
Established 1928
915 Olive Street
St. Louis 1, Missouri

## *FOR SALE*
## USED AIRCRAFT

**LANDSEAIRE EXECUTIVE AMPHIBIAN**
**Converted PBY5A**

| | |
|---|---|
| AIRFRAME—Since Conversion | 478:44 hrs. |
| ENGINES—P & W 1830-75's | |
| L/H—Since New | 139:33 " |
| R/H—Since New | 229:11 " |

Price $135,000

**BEECHCRAFT**
**(Converted AT-11)**

| | |
|---|---|
| AIRFRAME—Since Conversion | 1374:45 hrs. |
| ENGINES—P & W R985AN1 | |
| L/H—Since Overhaul | 141:40 " |
| R/H—Since Overhaul | 141:40 " |

Overhaul and relicensing completed in our own shops
Price $22,000

**GRUMMAN GOOSE**
**(G21A)**

| | |
|---|---|
| AIRFRAME—Since Conversion | 302:15 hrs. |
| ENGINES—P & W R985AN1 | |
| L/H—Since Overhaul | 302:15 " |
| R/H—Since Overhaul | 302:15 " |

PROPELLERS—Hamilton Standard Hydromatic
Electrically Actuated Landing Gear
80 Gallons of Extra Fuel in Floats
Price $60,000

SOUTHERN CALIFORNIA AIRCRAFT CORPORATION
Box 267, Ontario, California

## PRATT WHITNEY
**R2000 Cylinders**
NEW & SERVICEABLE
*Complete & Stud Assy*
**General Overseas Airline Inc.**
Newark Airport Newark, N. J.
Market 2-0963

**NEW**
Guaranteed Rebuilt
MOTORS-GENERATORS-CONTROLS
NOW IN STOCK
We buy surplus equipment
## L.J.LAND Inc.
Box 756 Reading-3 Pa.

**IMPORTANT!** ***Many items in this group have not been listed in previous ads!***

***One of America's largest stocks of UNUSED***

# AIRCRAFT PARTS

*We own and offer all parts listed—plus many thousands more—stocked in our Baltimore warehouse!*

### ELECTRONIC COMPONENT

| Quantity | Part No. | Description |
|---|---|---|
| 35 | RA10-DB | Receiver |
| 20 | TA-12B | Transmitter |
| 150 | DA-1F | Dynamotor |

### PRATT AND WHITNEY AIRCRAFT ENGINE PARTS

| Quantity | Part No. | Description |
|---|---|---|
| 166 | 1045A | Bearing |
| 500 | 3506 | Flange |
| 130 | 8288 | Follower Ass'y |
| 814 | 35814 | Blower Ass'y |
| 182 | 46400E | Liner |
| 30 | 48346 | Cylinder |
| 53 | 48362 | Shaft |
| 175 | 48363 | Shaft |
| 56 | 48392 | Sump |
| 390 | 48461 | Gear |
| 78 | 76236 | Gear |
| 1178 | 84289 | Bearing |
| 113 | 84487 | Housing |
| 77 | 84591C | Nose Housing |
| 200 | 48350-D | Crankcase Ass'y |
| 200 | 84083 | Cylinder |
| 100 | 84084 | Cylinder |
| 200 | 84085 | Cylinder |

**HUGE STOCKS OF ALL TYPES *AN* HARDWARE NEW—UNUSED. WRITE FOR DETAILED LISTINGS.**

### AIRCRAFT BEARINGS

| Quantity | Part No. |
|---|---|
| 18000 | K3L-2 |
| 8600 | K3L-R48 |
| 4000 | KF4 |
| 3000 | KF4H |
| 30000 | KP4R16-2 |
| 3300 | KSF5 |
| 17000 | BC5W11 |
| 28000 | KS6A |
| 34600 | NR6L12 |
| 7000 | 38KD4 |
| 6600 | RE3MR3 |
| 5000 | F35-14 |

### LEAR ACTUATORS AND SCREW JACKS

| Quantity | Part No. |
|---|---|
| 42 | 400 AJ3 |
| 161 | 420 EC |
| 160 | 420 DY |
| 26 | 550 CD |
| 14 | 550 CG |
| 195 | 550 AJ |
| 195 | 550 CP |
| 104 | 550 EC |

### ACCUMULATORS

| Quantity | Part No. | Mfg. |
|---|---|---|
| 53 | AN6203-3 | Bendix-10"-1500 P.S.I. |

### LIGHT ASSEMBLIES

| Quantity | Part No. | Mfg. |
|---|---|---|
| 2000 | A19-239W-24V (Bulb) | |
| 2000 | AN3096-4 | Grimes (Amber) |
| 800 | AN3096-5 | Grimes (Red) |
| 380 | AN3096-6 | Grimes (Green) |

### VALVES

| Quantity | Part No. | Mfg. |
|---|---|---|
| 478 | D9530 | Adel |
| 233 | D9530 | Adel |
| 428 | D9560-2 | Adel |
| 744 | D10044 | Adel |
| 2200 | AN4078-1 | United Aircraft (Oil Dilution) |
| 50 | 572-3A | Eclipse |
| 244 | D10051 | Adel |

### BLOWERS

| Quantity | Part No. | Mfg. |
|---|---|---|
| 25 | U702-15 | Joy |
| 16 | 125J-6 | Dynamic Air Eng. |
| 43 | 4582-AA-6C | Dynamic Air Eng. |
| 24 | 8861G-6C | Dynamic Air Eng. |

### OIL COOLER ASSEMBLIES

| Quantity | Part No. | Mfg. | Description |
|---|---|---|---|
| 45 | AN4103-2 | Clifford | Brass (Valve # U4785) |
| 38 | 18597-2 | Airesearch | Aluminum (Width 8") (Length 9") |

### PUMPS

| | | | |
|---|---|---|---|
| 230 | MF9-713-15A | Vickers | Hydraulic |
| 90 | AN6102-1(8818-2) | Adel | Fuel |
| 160 | 2E492E | Pesco | Fuel |
| 700 | TFD 8600 | Thompson | Fuel Booster |
| 125 | D7818 | Adel | Anti-icer |
| 170 | 2P771-A | Pesco | Fuel Booster |
| 250 | AN4014 | Erie Meter | Wobble (D-3) |
| 300 | 1H260-K & KA | Pesco | Hydraulic |

### INSTRUMENTS

| | | | |
|---|---|---|---|
| 19 | AN5531-1 | G. E. | Tach. Generator |
| 1000 | AN5780-2 | G. E. | Wheel & Flap Position Indicator |
| 400 | AN5780-2 | Weston | Same as above |
| 1000 | AW2-65B | U. S. Gauge | Air Pressure Gauge |
| 16 | 76B19 | Lewis Eng. | Cyl. Head Temp. |
| 10 | 46B2 | Lewis Eng. | Air Temp. Ind. |
| 31 | 47B21 | Lewis Eng. | Temperature Ind. |
| 12 | 47B22 | Lewis Eng. | Temperature Ind. |
| 20 | 47B23 | Lewis Eng. | Temperature Ind. |
| 36 | 47B24 | Lewis Eng. | Temperature Ind. |
| 10 | 76Z2 | Lewis Eng. | Air Temp. Ind. |
| 11 | 76B4 | Lewis Eng. | Temperature Ind. |
| 20 | 77C4 | Lewis Eng. | Temperature Ind. |
| 21 | 77C5 | Lewis Eng. | Temperature Ind. |
| 85 | 727TY72Z2 | Weston | Left Wing Anti-icing |
| 88 | 727TY73Z2 | Weston | Right Wing Anti-icing |
| 83 | 727TY74Z2 | Weston | Tail Anti-icing |
| 11 | 2227-11D-3A | Eclipse | Dual Tachometer |
| 22 | 8DJ-29-AAY | G. E. | Indicator (Cowl Flap) |
| 45 | 254BK-6-052 | Kollsman | Differential Pressure Ga. |
| 25 | 906-6-011 | Kollsman | Dual Altimeter and Differential Pressure Ga. |
| 8 | 14601-1G-B1 | Eclipse | Altitude Gyro |
| 22 | 15100-1B | Eclipse | Pitch Trim Ind. |
| 10 | 20000-8A-14 | Eclipse | Magnesym Position Ind. |
| 23 | 20100-11C-4-A1 | Eclipse | Magnesym Wing Flap Ind. |
| 40 | 23000-2A | Eclipse | Position Transmitter |
| 25 | 46N2 | Jaeger | 24 Hour Clock |

### MISCELLANEOUS COMPONENTS

| | | | |
|---|---|---|---|
| 44 | 5BA25DJ4B | G. E. | DC Motor (½ HP) |
| 83 | A4934 | Delco | Motor |
| 50 | RBD2220 | Holtzer Cabot | DC Motor |
| 49 | FD65-5 | Diehl | Motor |
| 47 | FD65-6 | Diehl | Motor |
| 116 | A371205 | Dumore | Motor |
| 780 | A371206 | Dumore | Motor |
| 115 | P4CA2A | Parker | Primer |
| 80 | AN3213-1 | Scintilla | Ignition Switch |
| 568 | A-9 (94-32226) | Nasco | Ignition Switch |
| 687 | RS-2 | Mallory | Selector Box |
| 90 | JH950-R | Jack & Heintz | Starter Motor |
| 492 | S-841 (94-32253) | Electronic Labs | Box |
| 6 | FA122 | Wallace & Tiernan | Flasher |
| 1000 | T3018-A | Bendix | Interphone Box |
| 140 | K14949E | Marquette | Windshield Wiper Kit |
| 40 | 3123-3A | Eclipse | Warning Unit |
| 188 | EYLC-2334 | Barber-Colman | Control |
| 11 | 12086-1C | Eclipse | Amplifier |
| 174 | 450-0 | Skinner | Gasoline Filter |
| 250 | 558-1A | Eclipse | Oil Separator |
| 100 | 564-2A | Eclipse | Oil Separator |
| 100 | 716-3A | Eclipse | Generator (NEA-3A) |
| 5 | 656536-421 | Sperry | Controller Pedestal (A-12) |
| 37 | 117-47 | Edison | Detector |
| 89 | 318 | Edwards | Horn |
| 280 | 921-B | Stewart-Warner | Heater (200000 BTU) |
| 340 | 981280 | Kidde | Co2 Cylinder |
| 85 | 12924-2 | Adel | Lock Valve |
| 90 | 923748 | Kidde | Oxygen Cylinder |
| 80 | DW28 | Eclipse | Transformer |
| 97 | 6041H-146A | Cutler Hammer | Relay (B-12) |
| 22 | 0655-D | Aro | Oxygen Regulator |
| 22 | M-2031 | Air Associates | Actuator |
| 148 | PG208AS1 | Minn. Honeywell | Air Ram Switch |
| 33 | DW47 | Eclipse | Transformer |
| 11 | DW33 | Eclipse | Transformer |
| 65 | ASDC2 | CO2 Mfg. Co. | Fire Detector |
| 750 | ND21 | American Gas Accumulator Co. | Time Delay Relay |
| 30 | UA-3150 | United Air Prod. | Oil Temp. Reg. 5° |
| 29 | UA-3160 | United Air Prod. | Oil Temp. Reg. 6° |
| 95 | UA-3160C | United Air Prod. | Oil Temp. Reg. 6° |
| 73 | UA-6007-CF-DV5 | United Air Prod. | Oil Temp. Reg. 7° |
| 14 | UA-6009-S-30 | United Air Prod. | Oil Temp. Reg. 9° |
| 11 | UA-6012K-S30K | United Air Prod. | Oil Temp. Reg. 12° |

★ ***Send us your material lists for screening!*** ***WRITE—WIRE—PHONE***

## COMMERCIAL SURPLUS SALES CO.

**4101 CURTIS AVENUE, BALTIMORE 26, MARYLAND** **TELEPHONE: CURTIS 3300**

## Our Un-Clear Clearances

For just a moment pretend that you are in the cockpit of a DC-6 at LaGuardia Field. Ready for takeoff? Here is your clearance:

**"Airways Traffic Control clears Flight 15 to the Chicago Airport via Red 23, Red 21, Red 33, Green 3, Red 55, Red 12, cross Yonkers and Little Ferry VFR, Newark 5,000 or above, Stroudsburg 11,000 or above, Selinsgrove 15,000, maintain 15,000."**

►**Are You Puzzled?**—Do you know now which way you are to go? Neither do I. This is a typical example of present day "rainbow" clearances.

Many years ago there were relatively few airways. They were, and still are, identified by color (amber, blue, red or green) and number. A flight between two given cities was generally along a single arterial airway. Many times no airway would be specified in an airways clearance; there was only one way to go. A complicated routing might contain three airways.

►**New Times, New Airways**—But times have changed. For purposes of traffic control, many new airways have been added. The same two given cities today have 3 or 4 connecting routes. To keep traffic separated, portions of all these, and others, may be used. So now it is not uncommon to be routed over 5 or 6 color/number combinations.

This results in an extremely complicated traffic clearance which a pilot must follow explicitly. With the exception of simple clearances on routes with which he is familiar, a pilot must get out a map and trace his assigned course. This in itself is a hard job. Especially at night under low-intensity red cockpit lighting. Many airways appear on maps as short, disjointed segments and there is often confusion when they disappear at an intersection. This is particularly true when they re-appear some distance beyond, apparently unconnected.

►**Muddy Maps—The fault, of course, is in the art of map making. The airway did not actually disappear, it just seemed to. Nevertheless it may be difficult to follow.**

Beyond being a difficult procedure, it may be dangerous. Pilots get their clearances by radio, and standard controller delivery is at high rpm. So it is generally impossible to copy, exactly, the entire message on paper. One must simply remember that it was Red 23, not Red 33. Or was it the other way 'round?

**Isn't there an easier way? Yes.**

►**Names, Not Numbers**—Specify only one color/number-designated airway per clearance. This will be the main or arterial route. For all diversions from this path use only the names of cities, or intersections, over which the plane is to fly.

Returning to our original clearance we now find our route to be ". . . via Newark. Stroudsburg, Green 3, Goshen and South Bend." Easy isn't it? Now everybody knows how to proceed.

**By comparison it will be found that fewer words are generally required when place names are used. This means less time on already crowded radio frequencies. Names mean less confusion also. The pilot's job is easier and so is the controller's.**

**This subject, incidentally, illustrates one of the truisms of operational aviation. Any time that "plain English" can be used in place of symbols there is a marked increase in safety. This applies to everything—marking of airways, taxiways, maps and charts, aircraft controls, weather reports.**

**The passion for speed in this industry has brought an overabundance of confusing hieroglyphics. A return to plain English wherever possible would be a welcome relief—at least the confusion would be readable.**

# WHAT'S NEW

## Telling the Market

A six-page folder on vibration fatigue testers made by All American Tool & Manufacturing Co., can be obtained by writing the company at 1014 West Fullerton, Chicago 14, Ill. . . . **Engineer's Notebook File** encloses reprints of Marman advertisements showing specific aviation applications of the company's clamps. Those asking for the folder, will be mailed any further material in the series as it appears. Write Marman Products Co., Inc., 940 W. Florence Ave., Inglewood, Calif.

The Cee-Bee desealing system consists of a nozzle bar mounted within a fuel tank. Stripping compound, pumped under pressure from a mobile reservoir, is sprayed through a nozzle bar to all interior surfaces of a fuel tank. The stripper dislodges the tank sealant then flows back to the 300-gal. reservoir Final operations are rinsing the tank with Cee-Bee A-3 cleaner diluted one-to-one with water then cleaning the surfaces and later drying them with hot air.

PAC is immediately setting up required facilities at its plants in Oakland, Cal.; Washington; Kansas City, Kan. and Linden, N. J. in addition to its Burbank base and Chino facility.

**Catalog** describing entire line of flush latches and hinges designed and built by Hartwell Aviation Supply Co. can be obtained by writing John Hogan at the company, address 9035 Venice Blvd., Los Angeles 34, Calif.

## New Addresses

**Butler Zimmerman, Inc.**, industrial designers specializing in aircraft work, have moved offices to 19 East 53d St., New York 22. The phone is PLaza 5-8278.

**Hufford Machine Works, Inc.**, has moved general office and manufacturing facilities from Redondo Beach, Calif., to larger quarters at 1700 E. Grand Ave., El Segundo.

## Publications Received

- **Adventures in Aviation Education**, edited by H. E. Mehrens, American Council on Education.
- **Aeronautical Training**, by C. A. & A. C. Zweng, Pan American Navigation Service, $3.50.
- **Rockets, Missiles & Space Travel**, by Willy Ley, Viking Press, $5.95.
- **(The) Seamless Story**, by J. P. Boore, Commonwealth Press.
- **Skygirl**, by M. M. Murray, Duell Sloan & Pearce, $3.00.

# ADVERTISERS IN THIS ISSUE

AVIATION WEEK—NOVEMBER 12, 1951


ADAMS-RITE MFG. COMPANY ..... 4
Agency—The Shaw Company

AEROPRODUCTS DIV. OF GENERAL MOTORS .... 43
Agency—Campbell-Ewald Co.

AEROTEC CORPORATION, THE ..... 36
Agency—Hening & Co., Inc.

AIRCRAFT RADIO CORP. ..... 7
Agency—Burke Dowling Adams, Inc.

ALLEN AIRCRAFT PRODUCTS, INC. ..... 65
Agency—The Fred Bock Adv. Co.

ALLMETAL SCREW PRODUCTS CO. ..... 56
Agency—Fred Lange Associates, Inc.

AMERICAN CHEMICAL PAINT CO. ..... 27
Agency—May Advertising Co.

AMERICAN NON-GRAN BRONZE CO. ..... 66
Agency—Norman P. Hewitt Co.

BENDIX PRODUCTS DIV. OF BENDIX AVIATION CORP. ..... Third Cover
Agency—MacManus, John & Adams, Inc.

BRAD FOOTE GEAR WORKS, INC. ..... 35
Agency—Reincke, Meyer & Finn, Inc.

C & H SUPPLY CO. (METAL CALS DIV.) ..... 40
Agency—Wallace Mackay Co.

CHAMPION SPARK PLUG CO. ..... 29
Agency—MacManus, John & Adams, Inc.

CITIES SERVICE OIL CO. ..... 45
Agency—Ellington & Co., Inc.

CLARY MULTIPLIER CORP. ..... 44
Agency—Batten, Barton, Durstine & Osborn, Inc.

CONTROL PRODUCTS, INC. ..... 63
Agency—George Homer Martin Associates

EASTMAN KODAK COMPANY ..... 37
Agency—J. Walter Thompson Co.

ECLIPSE-PIONEER DIV. OF BENDIX AVIATION CORP. ..... 24
Agency—MacManus, John & Adams, Inc.

ELECTROL, INCORPORATED ..... 54
Agency—G. Bruce Woodin Co.

FAIRCHILD ENGINE & AIRPLANE CORPORATION ..... 60
Agency—Buchanan & Co., Inc.

FILTRON CO., INC., THE ..... 8
Agency—Herbert Lindauer Adv.

FOOTE BROS. GEAR & MACHINE CORP. ..... Fourth Cover
Agency—The Buchen Company

GADGETS, INCORPORATED ..... 30
Agency—Kircher, Helton & Collett, Inc.

GARRETT CORPORATION, THE, AIRESEARCH MFG. CO. ..... 5
Agency—J. Walter Thompson Co.

GIANNINI & CO., INC., G. M. ..... 63
Agency—Western Adv. Agency, Inc.

GOODYEAR TIRE & RUBBER CO., INC. ... Front Cover
Agency—Kudner Agency, Inc.

HAYDON COMPANY, A. W. ..... 30
Agency—Cory Snow, Inc.

HYDRAULIC PRESS MFG. CO., THE ..... 58
Agency—The Jay H. Maish Co.

JOHNS-MANVILLE CORP. ..... 6
Agency—J. Walter Thompson Co.

KOPPERS COMPANY, INC. ..... 65
Agency—Vansant, Dugdale & Co., Inc.

LAMSON & SESSIONS CO., THE ..... 31
Agency—Belden & Hickox Adv.

LAVELLE AIRCRAFT CORP. ..... 8
Agency—Charles Blum Adv. Corp.

LEACH RELAY COMPANY ..... 65
Agency—The McCarty Co.

LOCKHEED AIRCRFAT CORP. ..... 32, 33
Agency—Foote, Cone & Belding Adv.

MARMAN PRODUCTS CO., INC. ..... 42
Agency—West-Marquis, Inc.

McGRAW-HILL BOOK CO., INC. ..... [illegible]

NATIONAL AERONAUTICAL CORP. ..... 30
Agency—Charles Blum Adv. Corp.

NEW DEPARTURE DIV. OF GENERAL MOTORS .. [illegible]
Agency—Albert Frank-Guenther Law, Inc.

NORTH AMERICAN AVIATION, INC. ..... 62, 73
Agency—Batten, Barton, Durstine & Osborn, Inc.

NYLCO PRODUCTS, INC. ..... 64
Agency—Howard Wesson Co.

OSTER MANUFACTURING CO., JOHN ..... 10
Agency—Ivan Hill Advertising

PACIFIC AIRMOTIVE CORP. ..... 26
Agency—Ensig Company, Ltd., The

PACKARD ELECTRIC DIV. OF GENERAL MOTORS 61
Agency—Campbell-Ewald Co.

PARKER APPLIANCE CO., THE ..... 52
Agency—Fuller & Smith & Ross, Inc.

PASTUSHIN AVIATION CORP. ..... 49
Agency—Lynn-Western, Inc.

PESCO PRODUCTS DIV., BORG WARNER CORP. ... 46
Agency—Fuller & Smith & Ross, Inc.

PIASECKI HELICOPTER CORP. ..... 64
Agency—B. K. Davis & Bro.

RUSSELL MFG. COMPANY ..... 64
Agency—Charles W. Hoyt Co., Inc.

RYAN AERONAUTICAL COMPANY ..... 53
Agency—Batten, Barton, Durstine & Osborn, Inc.

SEARCHLIGHT SECTION ..... 66, 67, 68, 69, 70, 71

SINCLAIR REFINING CO. ..... 38, 39
Agency—Morey, Humm & Johnstone, Inc.

SLICK AIRWAYS, INC. ..... 6
Agency—The Caples Co.

SNAP-ON TOOLS CORP. ..... 28
Agency—The Cramer-Krasselt Co.

THOMPSON AIRCRAFT TIRE CORP. ..... 57
Agency—Norton M. Jacobs Adv. Agency

THOMPSON PRODUCTS, INC. ..... 25
Agency—Meldrum & Fewsmith, Inc.

TIMKEN ROLLER BEARING CO., THE ..... 19
Agency—Batten, Barton, Durstine & Osborn, Inc.

TRANSPORT EQUIPMENT CO. ..... 73
Agency—Jaycraft Co.

TUBING APPLIANCE COMPANY ..... 56
Agency—Byron H. Brown & Staff

VINCO CORPORATION ..... 22
Agency—Whipple & Black Adv. Co.

WESTINGHOUSE ELECTRIC CORP. ..... 5
Agency—Fuller & Smith & Ross, Inc.

WITTEK MANUFACTURING COMPANY ..... 50
Agency—The Advertising Corp.

WRIGHT AERONAUTICAL CORP. ..... 2
Agency—Charles Dallas Reach Co., Inc.

ZENITH PLASTICS COMPANY ..... Second Cover
Agency—Francis D. Gonda Co.


SEARCHLIGHT SECTION
(Classified Advertising)


EMPLOYMENT
Positions Vacant ..... 66, 70
Positions Wanted ..... 66

SPECIAL SERVICES
Contract Work ..... 6

EDUCATIONAL
Books ..... 66

PLANES—EQUIPMENT
(Used or Surplus New)
For Sale ..... 69, 70, 71

WANTED
Planes—Equipment ..... 6



CUSTOM *Tailored*

TECO AIRLINE SEATS

. . . are tops with major airlines after comparison with other makes! Under the long-wearing custom finishes TECO seats have many individual feature refinements resulting in high strength, low weight, lowest maintainence and wonderful comfort! . . . WRITE FOR CATALOG.

TRANSPORT EQUIPMENT CO.
BURBANK • CALIFORNIA



# ENGINEERS

wanted at once

for

LONG-RANGE MILITARY AIRCRAFT PROGRAM

by

NORTH AMERICAN AVIATION, INC.

Los Angeles, California
Columbus, Ohio

Unusual opportunities for Aerodynamicists, Stress Engineers, Aircraft Designers and Draftsmen, and specialists in all phases of aircraft engineering. Engineering skills other than aircraft may be adaptable through paid training program. Also openings for

**Recent Engineering College and Technological Graduates**

Long-range military program offers fine chance for establishing career in aircraft while aiding defense effort. Transportation and established training time paid. Salaries commensurate with experience and ability.

**Please include summary of education and experience in reply to:**

Engineering Personnel Office
SECTION 3

NORTH AMERICAN AVIATION, INC.

Los Angeles International Airport
Los Angeles 45, Calif.
or
Columbus 16, Ohio

# EDITORIAL

## What's Going On? Plenty!

**(Just back from a field trip, talking to all levels of aviation manufacturing executives, an editor finds a desk piled high with letters from readers, industry leaders, staff memoes and reports, and then he hears personally from his New York headquarters staff of fact diggers and writers. What's going on in aviation? Plenty, as always. Here are a few important cross-currents industry is talking about.)**

Is big news brewing in the Air Force? Industry people everywhere are asking. This is the circumstantial evidence:

Gen. Wolfe resigned to accept a top spot with a Swiss firm involved in armament production. Coinciding with this is a strong rumor in Dayton and Washington that the Air Force will buy its own armament instead of continuing inter-service procurement through Army Ordnance.

Gens. Hopkins, Shepard and Quesada all resigned to enter industry, accompanied by some newspaper rumors of dissatisfaction with high-level policies. Gen. Chidlaw was replaced as AMC boss by Gen. Rawlings. Gen. Swofford—with engineering background—was transferred from WADC to the Air Force Institute of Technology. Is he being made to stand in a corner, a la Gen. Craigie? Col. John G. Salzman, new deputy to Gen. Smith, Chief of Procurement, has an Inspector General background more recently than his procurement experience.

Undersecretary McCone resigned. It is said reliably that he agreed to help Secretary Finletter only about a year. Gen. Kenney retired, but opinion is unanimous that this was a logical and expected event; he hasn't gone into industry, however.

Two persons were indicted for alleged irregularities in conducting Air Force business at Dayton—one a former USAF buyer, the other a representative of two minor electronics firms. A congressman says inquiries will turn up more incidents. So far, AVIATION WEEK's assiduous questioning in Washington, Dayton and elsewhere brings to light no trace of links that might tie any of the events above into a single story.

We have the unanimous answer that (1) The splitting-off of USAF research & development from the Air Materiel Command was a bitter pill to AMC; and (2) Those high officers listed above who entered private industry did it for the additional income, under pressure of the ever-increasing inflation.

### Complexity or Simplicity?

Touring the industry you hear but cannot verify the report that there is a new fighter or interceptor proposal out with the performance data left blank. Instead, the idea is stated very simply—to exceed the best efforts of the MiG-15.

You hear in the field and from your staff reports that those who have seen the wreckage of that captive MiG—and it is real wreckage, indeed—are surprised at the meticulous planning that prepared the design for production, so that unskilled labor in large numbers could turn out a creditable job. Surprising skill has brought economies in labor and materials in carefully chosen sections where shortcuts will not impair the overall strength or performance of the craft. In some respects, it's the Japanese theory of simplicity all over again.

Superior performance is won by weight-cutting, and clean design unincumbered by gadgets, protection for the pilot, complex and ever heavier equipment, wing-tapering, strength items.

Some would like to say it's merely a matter of Russian extravagance of pilots whereas we want our pilots back and back safe. It's not so simple. Somewhere there must be drawn a line between the Russian simplicity and the American over-extravagance of weight factors. Some of the top executives in our aircraft industry are deeply worried about the Air Force's continual trend toward more and more weight.

Somewhere, we must stop this trend and take realistic stock. We cannot forever put more weight to more power or we may wake up some morning to find ourselves greatly outdone with a better MiG, with a great deal less power than we ourselves are dragging around under built-in headwinds. What our powerplant man giveth, the other designers taketh away.

### Paper Work Is Bogged Down

You hear everywhere that the Air Force is lagging woefully in its paper work, and demanding always more. It's not uncommon to hear that entire lines of products have been proposed, designed, manufactured and deliveries completed, with no contract yet. This is tough on big firms; it's sometimes next to disastrous for small business. You hear everywhere that government, for all the pious words in Washington, is making it next to impossible for small business to exist.

And everywhere you hear that government—including the Air Force—is becoming so big that it not only doesn't know what its respective hands are up to; it doesn't know how many hands it has, and it is constantly being surprised at discovering a new one. Obviously, they impede each other.

Government's cumbersome bigness is a subject of bitter exasperation even for aviation manufacturers, who have always had more than their share of short notice demands, countermanding orders, and never-ending change orders. Government chiefs tell industry privately that if we were not trying to have both our guns and butter too, they could act more decisively. Maybe so; but that's not the whole story. Much of it is sheer bigness.

—Robert H. Wood

(The second of this series will appear next issue)